

Course descriptions

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COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KDMFI/2-UFY-165/22		Course title: Advanced Practicum of Physics School Experiments			
Educational activities: Type of activities: seminar Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 4.					
Educational level: II.					
Prerequisites:					
Course requirements: Continuous assessment: individual work - preparation and demonstration of the experiment (3x20 marks), lab reports (2x20 marks). Indicative rating scale: A 90%, B 80%, C 70%, D 60%, E 50%. Credits will not be awarded if a student scores less than 50%.					
Learning outcomes: Students will be familiar with a number of experiments with simple equipment. They will know the requirements for a simple physics experiment. Preparation of experiments using modern technology and using DT. They will gain experience in presenting simple experiments, consolidating and deepening knowledge of physics and examples of ways to help students develop their physical knowledge. They will know the sources of information about low-cost experiments.					
Class syllabus: Experiments especially on the topics of pressure, compressive force, fluid mechanics, rigid body mechanics, properties of substances of different states, transformations of states, demonstration experiments in electromagnetism with non-traditional equipment.					
Recommended literature:					
Languages necessary to complete the course: Slovak and English.					
Notes:					
Past grade distribution Total number of evaluated students: 67					
A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0
Lecturers: PaedDr. Peter Horváth, PhD.					
Last change: 18.06.2022					

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof.
RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFI.KAI/2-MXX-133/23		Course title: Artificial Intelligence for Everyone			
Educational activities: Type of activities: training session / course Number of hours: per week: 9 per level/semester: 1t / 117 Form of the course: on-site learning					
Number of credits: 6					
Recommended semester:					
Educational level: I.II., 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
45,45	36,36	4,55	9,09	4,55	0,0
Lecturers: prof. Ing. Igor Farkaš, Dr.					
Last change:					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFLKDMFI/2-UFY-256/15		Course title: Assessment of the Science Education Results			
Educational activities: Type of activities: course Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 4.					
Educational level: II., N					
Prerequisites:					
Course requirements: Continuous assessment: discussions (3x20 marks), presentation of the results of individual work (40 marks) Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50% Credits will not be awarded if student scores less than 50%.					
Learning outcomes: The graduate will know the basic principles for creating goals of physics and science education for formal education and also the relationship between formal and non-formal education. They will know the basic ways of evaluating the results of physics and science education.					
Class syllabus: Objectives of education, Taxonomy of objectives. Educational methods and methods of measuring educational results at the class and school level. Nationwide testing. High stakes testing. International measurements in science education.					
Recommended literature:					
Languages necessary to complete the course: Slovenský a anglický.					
Notes:					
Past grade distribution Total number of evaluated students: 31					
A	B	C	D	E	FX
87,1	6,45	3,23	0,0	0,0	3,23
Lecturers: PaedDr. Lukáš Bartošovič, PhD.					
Last change: 18.06.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFL.KAFZM/2-UFY-220/00	Course title: Astronomy and Meteorology
Educational activities: Type of activities: lecture / practicals Number of hours: per week: 2 / 1 per level/semester: 26 / 13 Form of the course: on-site learning	
Number of credits: 4	
Recommended semester: 4.	
Educational level: II.	
Prerequisites:	
Course requirements: Continuous assessment: tests (2x30 marks), discussions (4x10 marks). Indicative assessment: A: 100-90%, B: 90-80%, C: 80-70%, D: 70-60%, E: 60-50%. Credits will not be awarded if a student scores less than 50%. Scale of assessment (preliminary/final): 100/0	
Learning outcomes: Students will know the basic concepts in astronomy, the origin and development of individual cosmic bodies and structures, an explanation of the physical nature of atmospheric processes and processes taking place in the air, which create weather and climate, acquaintance with methods of forecasting synoptic situations and weather conditions.	
Class syllabus: History of astronomy, spherical astronomy (coordinate systems, stellar aberration, parallax, refraction), Solar system (Sun, planets, dwarf planets, comets, asteroids, meteors), origin and evolution of stars (Jeans critical mass, H-R diagram, nucleogenesis of elements, final evolution stages of stars), galactic astronomy, cosmology. Subject of meteorology, basic conceptions, role and organization of meteorological service. Basic meteorological elements and instrumentation of meteorological station. State equation, principal statics equation, barometric formula. Condensation and sublimation of water vapour. Adiabatic and pseudoadiabatic phenomenons. Thermal stratification. General circulation. Air masses. Atmospheric fronts. Pressure systems. Weather predictions. Human influence on climate.	
Recommended literature: Vanýsek V. 1980, Základy astronómie a astrofyziky, Academia Praha Beatty J. K., Petersen C. C., Chaikin A. eds.: 1999, The New Solar System, Sky Publ. Corp. and Cambridge Univ. Press Netopil, R. a kol.: Fysická geografie 1. SPN, Praha, 1984, 272 s. Zverev, A. S.: Synoptická meteorológia. Alfa, Bratislava, 1986, 711 s. Munzar, J. a kol.: Malý průvodce meteorologií. Praha, 1989, 248 s. Bednář, J.: Meteorologie. Portál, s.r.o., Praha, 2003, 224 s., ISBN 80-7178-653-5	

Glossary of meteorology. Second edition. American Meteorological Society, Boston, 2000, 855 s., ISBN 1-878220-34-9

Languages necessary to complete the course:

Slovak and English.

Notes:

Past grade distribution

Total number of evaluated students: 96

A	B	C	D	E	FX
86,46	9,38	4,17	0,0	0,0	0,0

Lecturers: RNDr. Marián Melo, PhD., prof. RNDr. Juraj Tóth, PhD.

Last change: 20.06.2022

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KDMFI/2-UXX-105/22	Course title: Computer Modeling and Measurement from the Perspective of Educational Psychology
Educational activities: Type of activities: seminar Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning	
Number of credits: 2	
Recommended semester: 1.	
Educational level: II.	
Prerequisites:	
Course requirements: Continuous assessment: 2 micro-appearances in front of the audience, evaluation of micro-appearances of classmates Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 100/0	
Learning outcomes: Students will develop the ability to use the resources of a computer-assisted science laboratory in teaching their approbation subjects in primary and secondary school. They will be able to plan the student's activity and the teacher's activity in the student's experiment, they will be able to use the CMA Coach science laboratory system and they will be able to evaluate the students' work in this laboratory.	
Class syllabus: student-supported guided research in science subjects, research teaching methods, interface, sensors, measurement with sensors, computer control (programming in Coach language), basics of laboratory safety, measurement of physical quantities and processing of measured values, measurement with sensors in chemistry teaching and biology, the use of the CMA Coach system in students' hobby work (within non-formal education), basic rules for the creation of instructional materials for students	
Recommended literature: Computer Aided Science Laboratory / Peter Demkanin et al .. Bratislava: Knižničné a edičné centrum, 2006 Evidence based teaching: A practical approach / Geoff Petty. Cheltenham: Nelson Thornes, 2006 Modern teaching: practical guide / Geoffrey Petty; translated from English by Štěpán Kovařík. Prague: Portal, 1996 Own electronic texts of the subject published through the subject's website.	
Languages necessary to complete the course: Slovak, English	

Notes:					
Past grade distribution Total number of evaluated students: 19					
A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0
Lecturers: doc. RNDr. Peter Demkanin, PhD.					
Last change: 22.06.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFL.KDMFI/2-UXX-124/22	Course title: Consultations on Methodology for the Final Work
Educational activities: Type of activities: seminar Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning	
Number of credits: 2	
Recommended semester: 2.	
Educational level: II.	
Prerequisites:	
Recommended prerequisites: Methodology of pedagogical research	
Course requirements: individual work during the semester, focused on the research part of the diploma thesis - depending on the type of research and after a personal agreement with the teacher (60%) - min. 3 individual consultations Exam: comprehensive research chapter of the future diploma thesis (40%) Assessment scale: A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 60 / 40	
Learning outcomes: The student: <ul style="list-style-type: none"> - deepen their knowledge of the basic stages and methods of empirical research of educational phenomena related to their research topic of the diploma thesis - design, implement and evaluate at least part of the research problem of their thesis - write a comprehensive chapter in his diploma thesis on research activities 	
Class syllabus: Course contents: <ul style="list-style-type: none"> - Repetition of the basics of qualitative and quantitative research, processing and interpretation of empirical data. - Implementation of procedures and selection of appropriate research techniques. - Acquiring field data collection skills and solving related problems. - Evaluation and consultation of the analysis of research results. - Submission and presentation of the final work. 	
Recommended literature: own electronic texts published on the website, resp. in the Moodle environment Qualitative research in pedagogical sciences / Švaříček, Roman and Klára Šed'ová. Prague: Portal, 2007	

Methods of pedagogical research: basics of quantitative research / Chráska, Miroslav. Prague: City, 2007
Guide to Qualitative Research Methodology / Peter Gavora. Bratislava: Comenius University, 2007
Basics of pedagogical-psychological research for student teachers / Martin Skutil et al .. Prague: Portal, 2011
Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research / John W. Creswell. Pearson 2011

Languages necessary to complete the course:

Slovak, English

Notes:

Past grade distribution

Total number of evaluated students: 54

A	B	C	D	E	FX
64,81	14,81	3,7	3,7	1,85	11,11

Lecturers: doc. Mgr. Karolína Miková, PhD., PaedDr. Tünde Kozánek Kiss, PhD.

Last change: 22.06.2022

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFL.KDMFI/2-UXX-124/22	Course title: Consultations on Methodology for the Final Work
Educational activities: Type of activities: seminar Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning	
Number of credits: 2	
Recommended semester: 3.	
Educational level: II.	
Prerequisites:	
Recommended prerequisites: Methodology of pedagogical research	
Course requirements: individual work during the semester, focused on the research part of the diploma thesis - depending on the type of research and after a personal agreement with the teacher (60%) - min. 3 individual consultations Exam: comprehensive research chapter of the future diploma thesis (40%) Assessment scale: A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 60 / 40	
Learning outcomes: The student: <ul style="list-style-type: none"> - deepen their knowledge of the basic stages and methods of empirical research of educational phenomena related to their research topic of the diploma thesis - design, implement and evaluate at least part of the research problem of their thesis - write a comprehensive chapter in his diploma thesis on research activities 	
Class syllabus: Course contents: <ul style="list-style-type: none"> - Repetition of the basics of qualitative and quantitative research, processing and interpretation of empirical data. - Implementation of procedures and selection of appropriate research techniques. - Acquiring field data collection skills and solving related problems. - Evaluation and consultation of the analysis of research results. - Submission and presentation of the final work. 	
Recommended literature: own electronic texts published on the website, resp. in the Moodle environment Qualitative research in pedagogical sciences / Švaříček, Roman and Klára Šed'ová. Prague: Portal, 2007	

Methods of pedagogical research: basics of quantitative research / Chráska, Miroslav. Prague: City, 2007
Guide to Qualitative Research Methodology / Peter Gavora. Bratislava: Comenius University, 2007
Basics of pedagogical-psychological research for student teachers / Martin Skutil et al .. Prague: Portal, 2011
Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research / John W. Creswell. Pearson 2011

Languages necessary to complete the course:

Slovak, English

Notes:

Past grade distribution

Total number of evaluated students: 54

A	B	C	D	E	FX
64,81	14,81	3,7	3,7	1,85	11,11

Lecturers: doc. Mgr. Karolína Miková, PhD., PaedDr. Tünde Kozánek Kiss, PhD.

Last change: 22.06.2022

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KDMFI/2-UXX-132/22	Course title: Cross-curricular Projects Focused on the Problems of Today's World
Educational activities: Type of activities: seminar Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning	
Number of credits: 2	
Recommended semester: 2.	
Educational level: II.	
Prerequisites:	
Course requirements: Continuous assessment: Active participation in classes (50%), design and implementation of a project with the implementation of a cross-cutting theme (50%). An exam: - Indicative evaluation scale: e.g. A 90%, B 80%, C 70%, D 60%, E 50% Weight of the mid-term / final evaluation: e.g. 100/0 Scale of assessment (preliminary/final): 100 / 0	
Learning outcomes: The student: <ul style="list-style-type: none"> - is able to include cross-cutting themes in the teaching of their subject in an appropriate way (especially environmental, multicultural, regional and media education), - learn about the possibilities of connecting approbation subjects in the form of project teaching, - gets ideas and inspirations for interdisciplinary projects. 	
Class syllabus: <ul style="list-style-type: none"> - Cross-cutting themes according to the official curriculum and the possibilities of their implementation in various subjects. - Topics found in the intersection of various subjects. - Authentic learning aimed at solving real problems of life. - Design and implementation of a project with the implementation of a cross-cutting theme. - Presentation of the results of the implemented project. 	
Recommended literature: <ul style="list-style-type: none"> - own electronic texts published on the website, resp. in the Moodle environment - Cárová, T. and Kohanová, I. 2012. Global primary school education - mathematics - methodical manual. [online] Slovak AID, Human at Risk, 2012. ISBN: 978-80- 970900-4-3 Available on the Internet: https://globalnevzdelavanie.sk/globalne-vzdelavanie-na-zs-matematika/ - Kireš. M., Ješková, Z., Ganajová, M., Kimáková, K. Research activities in science education. Bratislava: ŠPÚ, 2016. 	

- outputs from the IT academy project, where digital technologies are implemented in various subjects.

Languages necessary to complete the course:

Slovak

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. Ľudmila Jašková, PhD., doc. PaedDr. Peter Vankúš, PhD., doc. PaedDr. Klára Velmovská, PhD.

Last change: 22.06.2022

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KDMFI/2-UFY-205/22		Course title: Current Trends in Physics Education			
Educational activities: Type of activities: lecture / practicals Number of hours: per week: 2 / 2 per level/semester: 26 / 26 Form of the course: on-site learning					
Number of credits: 4					
Recommended semester: 3.					
Educational level: II.					
Prerequisites:					
Course requirements: Continuous assessment: project topic selection (10 marks), final project submission (20 marks), presentation (10 marks), peer-assessment of other projects (20 marks); Examination: written (20 marks), oral (20 marks) Indicative evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50% . Credits will not be awarded if a student scores less than 50%.					
Learning outcomes: The graduate will be didactically prepared for the tasks assigned to the beginning teacher. He will be able to choose from proven as well as modern methods and strategies in physics education.					
Class syllabus: Basic pedagogical documents, standards. Current concepts of teaching physics. Activities in teaching physics and developing students' competencies. Creativity-developing tasks, contextual tasks, project-type tasks. Means for checking and evaluating students' knowledge, creating tests, wide-ranging testing. Work with students with increased interest in physics (physics circles, Correspondence seminar, Physics Olympiad, Tournament of young physicists.) Department of Physics and school agenda. Control of the teaching process. Beginner teacher, school expectations from physics teacher graduates, teacher qualification process.					
Recommended literature:					
Languages necessary to complete the course: Slovak and English.					
Notes:					
Past grade distribution Total number of evaluated students: 76					
A	B	C	D	E	FX
94,74	3,95	1,32	0,0	0,0	0,0
Lecturers: doc. RNDr. Peter Demkanin, PhD., PaedDr. Tünde Kozánek Kiss, PhD.					

Last change: 18.06.2022

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFLKDMFI/2-UFY-237/22		Course title: Design of Educational Multimedia Materials			
Educational activities: Type of activities: seminar Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 3.					
Educational level: II.					
Prerequisites:					
Course requirements: After the first part of the semester, the student chooses a topic for the semester work (10 marks), elaborates (20 marks for preliminary work), submits the semester work (30 marks evaluation of the submitted version) and defends it (10 marks). Peer assessment of the work of colleagues is for 30 marks. To obtain credits, the student must obtain at least 50% marks.					
Learning outcomes: The student will have developed skills to design materials for physics education.					
Class syllabus: Design of the content of the text part, graphic design, stylistics, development of the pillars of the mind (according to Prof. Tokuham-Esponos), curriculum design (according to Klentschy). Approaches to the choice of topic for the elaboration of the semester work. Writing a term paper and defending it against peers.					
Recommended literature:					
Languages necessary to complete the course: Slovak and English.					
Notes:					
Past grade distribution Total number of evaluated students: 19					
A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0
Lecturers: doc. RNDr. Peter Demkanin, PhD.					
Last change: 18.06.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

STATE EXAM DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFL.KDMFI/2-UMA-951/15	Course title: Didactics of Mathematics
Number of credits: 3	
Educational level: II.	
Learning outcomes: The graduate will be ready to perform the tasks assigned to a beginning math teacher.	
Class syllabus: State final examination in the scope of master's study of mathematics didactics. The student should be able to include the task in the thematic unit, identify preconceptions and the necessary knowledge to solve it, determine the skills that the student will learn on it, respectively. concepts that allows you to discover. The student will demonstrate a model solution, point out problematic places in the solution with which students could have problems and how he would react to them as a teacher. After completing the task, the student should outline the activities that would follow and how he would close the lesson.	
State exam syllabus: <ol style="list-style-type: none"> 1. Logic and sets Logic (propositions, operations with propositions, logical conjunctions and quantifiers), sets (number of elements of unification of two and three sets, De Morgan's formulas for complement of unification and intersection), proofs and conclusions (direct and indirect proofs, proofs by dispute, mathematical induction, mode ponens, modus tollens). 2. Numbers, variables, numerical fields Binomial theorem and Pascal's triangle, derivation of formulas $a^n - b^n$ (including geometric interpretation for $n = 2$ and $n = 3$). 3. Number theory Number of prime numbers, relation of largest common divisor and smallest common multiple of two numbers, prime decomposition number of number divisors, irrationality of the square root of a prime number, derivation of divisibility criteria 4, 5, 10, 100, 3, 6, 9. 4. Equations, inequalities and their system Geometric interpretation of a system of two linear equations with two unknowns, conditions for the existence of solutions, equivalent and non-equivalent modifications and their relation to basic functions. 5. Function and its properties Basic transformations of function graphs, definitions of basic properties of functions (domain of definition, domain of values, increasing and decreasing, extrema and local extrema - sharp and fuzzy, examples), inverse function and its graph. 6. Linear and quadratic function Significance of coefficients k and q in the formula of the linear function $y = kx + q$, geometric meaning of the directive, quadratic function (derivation of the relation for calculating roots, coordinates of the vertex of the parabola). 7. Arithmetic and geometric sequence, infinite (geometric) series Basic relationship management. 	

8. Polynomials, power functions and linear polynomials

Root factors and their relation to the roots of a polynomial equation, square roots as inverse functions to power functions, definition of a rational power of a positive number, linear polynomial function (derivation of asymptote equations and conditions why $ad \neq bc$).

9. Exponential and logarithmic functions

Exponential functions (definition of power for natural, integer and rational exponent, basic properties of exponential function and their justification, simple and compound interest, regular deposits and withdrawals, loan repayments), definition of logarithm, rules for calculating logarithms and their connection with creation of exponential function, relationships between logarithms with different bases.

10. Trigonometric functions

Definition of trigonometric functions in a right triangle and using a unit circle and their mutual relation, values of trigonometric functions for basic angles, accounting formulas, formulas for double and half angle, relations for sum and difference of trigonometric functions.

11. Triangle

Consistency and similarity of triangles, Pythagorean and Euclidean theorems, different relations for the content of a triangle (Heron's formula, using sinus of angle, radius of inscribed and described circle), derivation of statements about intersections of angles, axes of sides, lines, heights, sine and cosine theorem.

12. Parallelograms and trapezoid

Derivation of formulas for the content of parallelograms and trapezoids, derivation of some of their properties the diagonals of a quadrilateral with sides a, b, c, d are perpendicular to each other just when $a^2 + c^2 = b^2 + d^2$).

13. Circle

Formula for the content of a circle and a paragraph, size in degrees and radians, center and circumferential angle, Tales' theorem, estimation of the number π using written and described n -gons, related to trigonometric functions.

14. Analytical geometry in the plane and in space

Vectors and operations with them, scalar product and its relation to the angle of two vectors, analytical expression of a line and a plane, various equations of a line, derivation of coordinates of the center of a line and a dividing line in a given ratio, center of a triangle, size of a line, derivation of a formula lines and from the plane, angle of two lines (using scalar product, using directives), angle of line and plane, normal vector.

15. Sets of points of given properties and their analytical expression

Derivation of "basic" sets of points of a given property (including a set of points from which a line can be seen at a given angle).

16. Conic sections

Definitions of conic sections (circle, ellipse, hyperbola and parabola) as sets of points of given properties and derivation of their equations.

17. Suitable and similar representations, construction tasks

Examples of design tasks solved by a combination of calculation and construction, the use of sets of points of given properties in design tasks, examples of design tasks solved using identical and similar representations.

18. Basic ways of displaying space in a plane

Basic properties of parallel projection, hint of their justification, linear perspective and its basic properties, layers and their basic properties.

19. Linear formations in space - positional problems

Use of basic statements about the intersections of a pair of parallel ones planes with another plane when constructing sections of bodies by a plane.

<p>20. Solids Cavalieri's principle and its application e.g. to calculate the volume of a sphere, a formula for calculating the volume of pyramids and cones, the idea of justifying the formula for the surface of a sphere.</p> <p>21. Combinatorics Combinatorial identities, basic combinatorial rules (sum, product), typical examples of their use, derivation of formulas for the number of variations, combinations, permutations (also with repetition), combinatorial derivation of basic relations in the Pascal triangle (symmetry, sum of minor elements).</p> <p>22. Probability Statistical and Laplace definition of probability, dependent and independent events, calculation of probability for independent events, geometric probability and an example of its use.</p> <p>23. Statistics Statistical set and position measures (modus, median, mean), basic properties of the arithmetic mean (sum of deviations from the mean is equal to 0), various possibilities of describing the "scatter" of the set, Chebyshev's inequality.</p>
<p>Languages necessary to complete the course: slovak, english</p>
<p>Last change: 17.03.2022</p>
<p>Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.</p>

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFL.KDMFI/2-UMA-104/22	Course title: Didactics of Mathematics (1)
Educational activities: Type of activities: seminar Number of hours: per week: 3 per level/semester: 39 Form of the course: on-site learning	
Number of credits: 4	
Recommended semester: 1.	
Educational level: II., N	
Prerequisites:	
Course requirements: Continuous assessment: group homework, reading of scientific articles, discussion of articles and the specified topic, group work on a lesson plan described for each group in the assignment. The student must obtain at least 50% of the continuous assessment and each assignment must be evaluated with a non-zero number of points. Final evaluation: oral exam, individual preparation of a lesson plan and its presentation Indicative assessment scale: A 94%, B 86%, C 79%, D 70%, E 60%, Fx <60% Scale of assessment (preliminary/final): 60/40	
Learning outcomes: The student will gain an overview of didactic theories, will be able to critically evaluate them and use the appropriate methods and forms. Through activities at the seminar, they will acquire modern teaching techniques that are a prevention of formal knowledge and misconceptions in mathematics. The study of scientific and research articles and the subsequent discussion or authentic experience will give graduates a better insight into the issues of inclusive school, creating preparations for the lesson (or sequence) and asking "good questions".	
Class syllabus: The language of mathematics, its historical development and didactic significance. A parallel between phylogeny and ontogeny of mathematical thinking. Conceptual and cognitive process in mathematics. Principles, means and forms of teaching in mathematics. Objectives of the teaching process in mathematics. Learning theories. Lesson preparation and its starting points. Resources and their use in preparation, during teaching in evaluation. Hypothetical learning trajectories.	
Recommended literature: Dítě, škola a matematika: Konstruktivistické přístupy k vyučování / Milan Hejný, František Kuřina. Praha : Portál, 2001 Moderní vyučování / George Petty Praha : Portál, 1993 Dvacet pět kapitol z didaktiky matematiky / Milan Hejný, Jarmila Novotná, Nad'ea Stehlíková (Eds.) Praha, 2004	

Komunikácia v inkluzívnej škole / Marta Hornáková. Bratislava: Univerzita Komenského v Bratislave. 2017

Elementary and Middle School Mathematics: Teaching Developmentally. / John A. Van de Walle, Karen Karp, Jennifer M. Bay-Williams. Pearson.

Theory of didactical situations in mathematics /Guy Brousseau. Springer, 1997

Textbook explanations: Modes of reasoning in 7th grade Israeli mathematics textbooks. / Silverman B, and Even R., CERME 9. Charles University in Prague. Faculty of Education. 2015, pp.205-212

Od obsahu vzdelávání k žakově znalosti: Kritická místa na cestě do školy a ze školy / T. Janik, Arnica 8, 2018, 1–8. Západočeská univerzita v Plzni, Plzeň.

Refining teacher design capacity: Mathematics teachers' interactions with digital curriculum resources / Birgit Pepin, Ghislaine Gueudet, Luc Trouche. In. ZDM Mathematics Education, 2017, 49, 799–812 <https://doi.org/10.1007/s11858-017-0870-8>

Own electronic materials published via the subject's website (eg course in LMS Moodle)

Languages necessary to complete the course:

slovak, english

Notes:

Past grade distribution

Total number of evaluated students: 229

A	B	C	D	E	FX
85,15	9,61	3,49	0,87	0,0	0,87

Lecturers: doc. PaedDr. Mária Slavičková, PhD.

Last change: 15.06.2022

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFLKDMFI/2-UMA-105/22	Course title: Didactics of Mathematics (2)
Educational activities: Type of activities: seminar Number of hours: per week: 4 per level/semester: 52 Form of the course: on-site learning	
Number of credits: 4	
Recommended semester: 2.	
Educational level: II., N	
Prerequisites:	
Course requirements: Continuous assessment: individual preparation of a lesson plan and its placement in the thematic plan, microteaching, preparation of written tests (2 equal groups), peer assessment, didactic analysis of teaching texts, reading and discussion of scientific articles. The student must obtain at least 50% of the continuous assessment and each assignment must be evaluated with a non-zero number of points. Exam: written with oral consultation Indicative assessment scale: A 94%, B 86%, C 79%, D 70%, E 60%, Fx <60% Scale of assessment (preliminary/final): 60/40	
Learning outcomes: The graduate of the course is acquainted with the goals of mathematics education at lower secondary school, with adequate teaching methods, forms and means, with ways of introducing selected mathematical concepts, is ready for his work in school and out of school, can transfer to pedagogical practice knowledge and skills acquired in individual professional disciplines. The study of scientific and research articles with a subsequent discussion or an authentic experience will give graduates a better insight into the cognitive and affective components of mathematics teaching at lower secondary school.	
Class syllabus: Specifics of teaching mathematics for individual topics and concepts of mathematics at lower secondary school: educational goals, activities, the assumption of the development of student understanding in the context of educational activities and the creation of a hypothetical trajectory. Selection of adequate methods, forms and age-appropriate activities for teaching mathematics at the second stage of primary school. Integration of digital technologies into the teaching of mathematics also in order to support argumentation, reasoning, and building a mathematical culture (correctness of concepts, procedures, arguments, etc.).	
Recommended literature: Dítě, škola a matematika: Konstruktivistické přístupy k vyučování / Milan Hejný, František Kuřina. Praha : Portál, 2001	

Moderní vyučování / Geoffrey Petty. Praha : Portál, 1993
 Is this a coincidence? The role of examples in fostering a need for proof / Buchbinder, O., Zaslavsky, O., ZDM Mathematics Education 43, 269 (2011). <https://doi.org/10.1007/s11858-011-0324-7>
 Elementary and Middle School Mathematics: Teaching Developmentally. / John A. Van de Walle, Karen Karp, Jennifer M. Bay-Williams. Pearson. 2012
 Strategies for Teaching Fractions: Using Error Analysis for Intervention and Assessment / David B. Spangler.
 Dvacet pět kapitol z didaktiky matematiky / Milan Hejný, Jarmila Novotná, Nad' a Stehlíková (Eds.) Praha, 2004
 Dostupné učebnice Matematiky pre 5. – 9. ročník ZŠ a nižšie ročníky osemročných gymnázií / Ján Žabka, Pavol Černek / Ondrej Šedivý a kol. / Soňa Čeretková a kol. / Milan Hejný a kol.
 Nový Pomocník z matematiky (5. – 9. ročník) / Iveta Kohanová a kol.
 Own electronic materials published via the subject's website (eg course in LMS Moodle)

Languages necessary to complete the course:

slovak, english

Notes:

Past grade distribution

Total number of evaluated students: 194

A	B	C	D	E	FX
65,46	17,53	12,37	3,09	1,03	0,52

Lecturers: doc. PaedDr. Mária Slavičková, PhD., doc. PaedDr. Peter Vankúš, PhD.

Last change: 17.06.2022

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFLKDMFI/2-UMA-106/22	Course title: Didactics of Mathematics (3)
Educational activities: Type of activities: seminar Number of hours: per week: 4 per level/semester: 52 Form of the course: on-site learning	
Number of credits: 4	
Recommended semester: 3.	
Educational level: II., N	
Prerequisites:	
Course requirements: Continuous assessment: individual preparation of a lesson plan and its placement in the thematic plan, microteaching, preparation of written tests (2 equal groups), peer assessment, didactic analysis of teaching texts, reading and discussion of scientific articles. The student must obtain at least 50% of the continuous assessment and each assignment must be evaluated with a non-zero number of points. Exam: written with oral consultation Indicative assessment scale: A 94%, B 86%, C 79%, D 70%, E 60%, Fx <60% Scale of assessment (preliminary/final): 60/40	
Learning outcomes: The graduate of the course is acquainted with the goals of mathematics education at upper secondary schools, with adequate teaching methods, forms and means, with ways of introducing selected mathematical concepts, is ready for his work at school and outside school, can transfer to pedagogical practice knowledge and skills acquired in individual professional disciplines. Specially, the graduate of the course will gain an overview of didactic procedures for teaching mathematics suitable for the transition from lower to upper secondary school and in the first years of upper secondary school.	
Class syllabus: Specifics of the last year of lower secondary school, transition to the 1st year of upper secondary school. Appropriate activities of teaching mathematics for individual topics of the first and second year of upper secondary school: educational goals, activities, the assumption of the development of student understanding in the context of educational activities and the creation of their hypothetical scenario. Selection of adequate methods, forms and cognitively appropriate activities. Integration of digital technologies into the teaching of mathematics also in order to support argumentation, reasoning, and building a mathematical culture (correctness of concepts, procedures, arguments, etc.).	
Recommended literature:	

Dítě, škola a matematika: Konstruktivistické přístupy k vyučování / Milan Hejný, František Kuřina. Praha : Portál, 2001
 Moderní vyučování / Geoffrey Petty Praha : Portál, 1993
 Dvacet pět kapitol z didaktiky matematiky / Milan Hejný, Jarmila Novotná, Nad' a Stehnlíková (Eds.) Praha, 2004
 Thinking mathematically / John Mason, Leone Burton, Kaye Stacey. Pearson, 2010
 Explanation and Proof in Mathematics. Philosophical and Educational Perspectives / G. Hanna, H. N. Jahnke, H. Pulte (Eds.), Springer 2010
 Matematika a svet okolo nás : Zbierka úloh / Zbyněk Kubáček ... [et al.]. Bratislava : Pavol Cibulka, 2008
 Učebnice matematiky pre gymnáziá / Zbyněk Kubáček
 Matematika : 1 : zbierka úloh pre stredné školy / Iveta Kohanová ... [et al.]. Bratislava : Orbis Pictus Istropolitana, 2011
 Own electronic materials published via the subject's website (eg course in LMS Moodle)

Languages necessary to complete the course:

Notes:

Past grade distribution

Total number of evaluated students: 193

A	B	C	D	E	FX
66,32	19,69	9,33	2,07	2,59	0,0

Lecturers: doc. PaedDr. Mária Slavíčková, PhD., doc. PaedDr. Peter Vankúš, PhD.

Last change: 15.06.2022

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFL.KDMFI/2-UMA-107/22	Course title: Didactics of Mathematics (4)
Educational activities: Type of activities: seminar Number of hours: per week: 3 per level/semester: 39 Form of the course: on-site learning	
Number of credits: 4	
Recommended semester: 4.	
Educational level: II.	
Prerequisites:	
Course requirements: Continuous assessment: individual preparation of a lesson plan and its placement in the thematic plan, microteaching, preparation of written tests (2 equal groups), peer assessment, didactic analysis of teaching texts, reading and discussion of scientific articles. The student must obtain at least 50% of the continuous assessment and each assignment must be evaluated with a non-zero number of points. Exam: written with oral consultation Indicative assessment scale: A 94%, B 86%, C 79%, D 70%, E 60%, Fx <60% Scale of assessment (preliminary/final): 60/40	
Learning outcomes: The graduate of the course will gain an overview of didactic procedures in the teaching of mathematics at upper secondary school and in the preparation of students for the school-leaving examination in mathematics, in extracurricular activities. The described activities of the educational process are focused on the creative use of knowledge from mathematics acquired during the study.	
Class syllabus: Selected activities for teaching mathematics on the topics of the third and fourth year of high school (for graduates and non-graduates): educational goals, activities, the assumption of the development of student understanding in the context of educational activities and the creation of hypothetical trajectories.	
Recommended literature: Učebnice matematiky pre gymnáziá / Zbyněk Kubáček Matematika : 1 : zberka úloh pre stredné školy / Iveta Kohanová ... [et al.]. Bratislava : Orbis Pictus Istropolitana, 2011 Seminár z matematiky, časti 1 – 3 / Zbyněk Kubáček, Ján Žabka Explanation and Proof in Mathematics. Philosophical and Educational Perspectives / G. Hanna, H. N. Jahnke, H. Pulte (Eds.), Springer 2010 Thinking mathematically / John Mason, Leone Burton, Kaye Stacey. Pearson, 2010 Maturitné testy z matematiky /nucem.sk	

Own electronic materials published via the subject's website (eg course in LMS Moodle)					
Languages necessary to complete the course: slovak, english					
Notes:					
Past grade distribution Total number of evaluated students: 52					
A	B	C	D	E	FX
82,69	11,54	3,85	1,92	0,0	0,0
Lecturers: doc. PaedDr. Mária Slavíčková, PhD., doc. PaedDr. Peter Vankúš, PhD.					
Last change: 17.06.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFLKMANM/2- UMA-259/22	Course title: Didactics of Mathematics in Praxis (1)
Educational activities: Type of activities: seminar Number of hours: per week: 3 per level/semester: 39 Form of the course: on-site learning	
Number of credits: 2	
Recommended semester: 3.	
Educational level: II.	
Prerequisites:	
Course requirements: Ongoing evaluation: homeworks Indicative rating scale: A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 100/0	
Learning outcomes: Students will be prepared for the situations they will experience in the reality of teaching mathematics at the second primary education stage. They will know various teaching techniques, methods of interpretation, working with the textbook as well as supplementary materials, various forms of written and oral examinations, as well as methods of correcting children's solutions. They will learn to distinguish which statements help students and which harms them.	
Class syllabus: Demonstrations of a transmissive and constructivist way of leading a lesson. Error preview. Textbook as a teacher's aid. Textbook as a student aid. (Topics will be documented in the curriculum of the second primary education stage).	
Recommended literature: Aj geometria naučila človeka myslieť / Milan Hejný. Bratislava : Slovenské pedagogické nakladateľstvo, 1990 Analýza řešení slovních úloh : Kapitoly z didaktiky matematiky. / Jarmila Novotná.. Praha : Univerzita Karlova,, 2000. Dítě, škola a matematika : Konstruktivistické přístupy k vyučování / Milan Hejný, František Kuřina. Praha : Portál, 2001 Teória vyučovania matematiky 2 / Milan Hejný ... [et al.]. Bratislava : Slovenské pedagogické nakladateľstvo, 1990	
Languages necessary to complete the course: Slovak, English	
Notes:	

Past grade distribution					
Total number of evaluated students: 119					
A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0
Lecturers: doc. RNDr. Zbyněk Kubáček, CSc., Mgr. Lucia Šimová					
Last change: 15.03.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFLKMANM/2- UMA-260/15	Course title: Didactics of Mathematics in Praxis (2)
Educational activities: Type of activities: seminar Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning	
Number of credits: 2	
Recommended semester: 4.	
Educational level: II.	
Prerequisites:	
Course requirements: Ongoing evaluation: homeworks Indicative rating scale: A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 100/0	
Learning outcomes: Students will be prepared for the situations they will experience in the school reality of teaching mathematics in secondary school. They will know various teaching techniques, methods of interpretation, working with the textbook as well as supplementary materials, various forms of written and oral examinations, as well as methods of correcting children's solutions. They will learn to distinguish which statements help students and which harms them.	
Class syllabus: Evaluation and classification. Preparations, analysis and corrections of written works and tests (topics will be documented in the secondary school curriculum).	
Recommended literature: Aj geometria naučila človeka myslieť / Milan Hejný. Bratislava : Slovenské pedagogické nakladateľstvo, 1990 Dítě, škola a matematika : Konstruktivistické přístupy k vyučování / Milan Hejný, František Kuřina. Praha : Portál, 2001 Stavba planimetrie / Ján Gatiaľ, Milan Hejný. Bratislava : Slovenské pedagogické nakladateľstvo, 1973 Teória vyučovania matematiky 2 / Milan Hejný ... [et al.]. Bratislava : Slovenské pedagogické nakladateľstvo, 1990 Analýza řešení slovních úloh : Kapitoly z didaktiky matematiky. / Jarmila Novotná.. Praha : Univerzita Karlova, 2000.	
Languages necessary to complete the course: Slovak, English	

Notes:					
Past grade distribution Total number of evaluated students: 81					
A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0
Lecturers: doc. RNDr. Zbyněk Kubáček, CSc., Mgr. Lucia Šimová					
Last change: 15.03.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

STATE EXAM DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFL.KDMFI/2-UFY-961/15	Course title: Didactics of Physics
Number of credits: 3	
Educational level: II.	
<p>Course requirements: The final examination is realized by the student's discussion with the members of the commission on two topics from the content exams. Assessed: illustration of concepts on suitable examples / contexts / situations 0-3 points; correctness of physical terminology 0-3 points; intelligibility of statements 0-3 points; responding to Commission questions concerning selected heading 0-3 points; responding to other commission questions broader context 0-3 points. Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50% The exam is successfully passed if the student obtains at least 50% of points.</p>	
<p>Learning outcomes: The graduate is ready to perform the tasks assigned to a beginning physics teacher.</p>	
<p>Class syllabus: Movement and force, movement on a circle. Movement of a mass point along a circle. Movements of bodies in the homogeneous gravitational field of the Earth from a kinematic point of view. Movement and force, impulse of force and change of momentum Newton's laws of motion. Static and dynamic friction force during shear friction on a horizontal surface. Inclined plane, without friction, with friction. Momentum and impulse of force. The law of conservation of momentum. Mechanical work, mechanical energy. The work of constant force. Variable force work - from a graph of force versus time. Working when stretching a linear spring. Potential energy of the body in a homogeneous gravitational field. Potential energy of the body in the radial gravitational field of the Earth. Kinetic energy of sliding motion. Mechanical energy conservation law. Rigid body. Center of gravity. Equilibrium positions. Moment of force. Moment sentence. Simple machines - lever, pulley. Body stability. Kinetic energy of a rotating body. The moment of inertia of a rigid body. Momentum. Momentum conservation. Steiner's theorem. Radial gravitational field of the Earth. Newton's general law of gravitation. Movement of a body in a radial gravitational field, kinetic and potential energy of a body moving in a radial gravitational field. Geostationary satellite. Fluid statics. Pressure. Hydrostatic pressure. Archimedes' law. Atmospheric pressure, changes in pressure and air density with altitude. Atmospheric pressure measurement. Ideal fluid flow. Continuity equation. Bernoulli's equation for horizontal flow and for flow with vertical cant. Heat and temperature. Mass heat capacity. Changes in energy states. Calorimetric equation. It happens in an ideal gas, equation of state. Isothermal plot. Isobaric story. Isochoric plot. Adiabatic story. Equation of state of an ideal gas. Electric voltage, electric current, electric resistance. Electromotive and terminal supply voltage. Work and power of direct current. Short circuit in electrical circuit.</p>	

DC circuit. Voltage and current measurement. Ohm's law for a part of an electrical circuit. The resulting resistance of resistors connected in series and side by side. Kirchoff's laws. Dependence of conductor resistance on its temperature and dimensions. Volt-ampere characteristic of resistor and filament lamp.

Stationary magnetic field. Description of the magnetic field. Magnetic field of a permanent magnet. Magnetic field of a conductor with electric current. Electromagnet. Force of magnetic field on current conductor. Mutual force action of two conductors with current.

Unsteady magnetic field. Electromagnetic induction. Lenz's law. Transformation of alternating voltages. Power plant model, transmission system.

Oscillating movement. Spring oscillator. Mathematical pendulum. Relationship between harmonic oscillation and uniform motion along a circle. Kinematics and dynamics of the mentioned oscillators, graphs of dependences of instantaneous values of quantities describing oscillating motion from time and from instantaneous deviation from equilibrium position.

Waves. Equation of successive mechanical wave. Wave interference. Standing waves on a stretched fiber. Sound and its properties. Sound speed measurement.

Light and its properties. Light as an electromagnetic wave. Determination of water refractive index.

Wave properties of light. Decomposition of light by a prism and an optical grating. RGB, CYM.

Atomic physics. Continuous and line emission and absorption spectra. Photoelectric effect, X-rays, origin and properties. Thomson's discovery of the electron. Rutherford's experiment.

Nuclear Physics. Radioactivity, half-life, fission and fusion.

Distances in space and basic concepts of stellar evolution.

Theoretical methods of cognition - classification, analytical-synthetic method, inductive-deductive method, analogy; Empirical methods of cognition - observation in physics education, developing students' skills associated with observation and communicating the results of observation; Empirical methods of cognition - measuring the values of a physics quantity, direct and indirect measurement; Empirical methods of cognition - measuring the interdependence of physical quantities; Empirical methods of cognition - experiment - student activity; Empirical methods of cognition - experiment - teacher planning; Classification of school experiments; Teaching methods - contextual teaching; Communication methods in school physics - graph linearization; Theoretical methods of cognition - graphic integration; Experiments and experiments with simple tools - their role and examples; Physics problem - formative function of a physics problem; Physics task - the function of the physics task in summative evaluation; The role of the teacher and the role of the student in physics education; Objectives of physics education; Defining the content of physics education curriculum. Application of interdisciplinary relationships in teaching physics. Realization of cross-curricular goals by physics education; Formal, non-formal and informal physics education.

State exam syllabus:

Recommended literature:

Literature recommended by subjects of master's study.
Physics textbooks for lower and higher secondary schools.
Selected foreign physics textbook.
Documents of the selected educational system.

Languages necessary to complete the course:

Slovak and English.

Last change: 12.11.2021

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFL.KDMFI/2-UFY-104/22	Course title: Didactics of Physics (1)
Educational activities: Type of activities: lecture / laboratory practicals Number of hours: per week: 2 / 2 per level/semester: 26 / 26 Form of the course: on-site learning	
Number of credits: 5	
Recommended semester: 1.	
Educational level: II., N	
Prerequisites:	
Course requirements: During the semester, there will be two written examinations, from which the student can obtain max. 2x 15 marks. In the middle of the semester, the student submits a plan of semester work - max. 10 marks. At the end of the semester, the student submits a semester work - max. 20 marks and lab reports (2x10 marks). In the exam period, there will be a structured discussion, where the student can get max. 20 marks. Credits will not be awarded if the student scores less than 50% of the marks.	
Learning outcomes: Graduates will look at teaching physics from a teacher's perspective. They will know the goals, methods and styles of teaching physics. Graduates will know commercially available and used teaching equipment; they will use them appropriately. They will be able to carry out experiments with simple tools and the use of modern technology and with the help of digital technologies. They will be able to plan lessons in which empirical methods are applied, both a teacher demonstration experiment and, in particular, a student heuristic experiment.	
Class syllabus: Physics didactics and teacher training. Knowledge system and its structure. Cognition in cycles. Conditions necessary for the child to learn. Ways to support learning (scaffolding). Physics knowledge and teaching physics. Cognition, methods of cognition. Models and modelling in physics education. The function of experiments in physics education. Observation and measurement. Physical procedures in teaching science subjects. Solution and function of physical problems in teaching. Objectives of teaching physics. Experiments and experiments mainly in the fields of geometric and wave optics, atomic physics.	
Recommended literature:	
Languages necessary to complete the course:	
Notes:	

Past grade distribution					
Total number of evaluated students: 102					
A	B	C	D	E	FX
57,84	26,47	8,82	4,9	0,98	0,98
Lecturers: doc. PaedDr. Viera Haverlíková, PhD., PaedDr. Peter Horváth, PhD.					
Last change: 18.06.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KDMFI/2-UFY-106/15		Course title: Didactics of Physics (2)			
Educational activities: Type of activities: lecture / practicals Number of hours: per week: 1 / 1 per level/semester: 13 / 13 Form of the course: on-site learning					
Number of credits: 3					
Recommended semester: 2.					
Educational level: II., N					
Prerequisites:					
Course requirements: Continuous assessment: seminar activities (4x10 marks) Exam: written (60 marks) Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50% Credits will not be awarded if a student scores less than 50%.					
Learning outcomes: Graduates will have developed skills needed in creating a lesson in physics, choosing the goals of the lesson, ways and means of fulfilling these goals. They will also have developed personal qualities, support for the assertive behavior and communication skills of the future physics teacher.					
Class syllabus: From learning sequence, through the topic in teaching to the thematic unit. Objectives of teaching physics at primary and secondary school. Physics as a part of science education and as a part of technology basics. Specifics of teacher's work in non-formal education (physics circle, club, physical competitions), non-formal education of students outside school. Examples of teaching sequences and topics for analysis are mainly in the areas of electromagnetic induction, mechanical and electromagnetic waves, geometric and wave optics.					
Recommended literature:					
Languages necessary to complete the course: Slovak and English.					
Notes:					
Past grade distribution Total number of evaluated students: 85					
A	B	C	D	E	FX
68,24	21,18	7,06	2,35	1,18	0,0
Lecturers: doc. PaedDr. Viera Haverlíková, PhD.					

Last change: 18.06.2022

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

STATE EXAM DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFLKAG+KDMFI/2- UXX-991/22	Course title: Diploma Thesis Defense
Number of credits: 10	
Educational level: II.	
Course requirements: Examination: state examination Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 0/100	
Learning outcomes: The student is able to work on the chosen topic at the level of scientific study with a representative selection of professional literature, with appropriately selected scientific procedures and hypotheses that can be verified. The diploma thesis is a contribution in the relevant field of study.	
Class syllabus: 1. The contribution of the final work for the given field of study depending on its nature and degree of study. The evaluation of the diploma thesis takes into account whether the student adequately processes the selected topic at the level of scientific study with a representative selection of professional literature, whether the chosen scientific procedures are appropriate and appropriate, and whether he adequately works with hypotheses that can be verified. The diploma thesis should be a clear contribution in the relevant field of study; 2. Originality of the thesis (the final thesis must not have the character of a plagiarism, must not infringe the copyrights of other authors), part of the documentation for the defense of the final thesis as a subject of state examination is the protocol of originality from the central register. 3. Correctness and correctness of citation of used information sources, research results of other authors and author groups, correctness of description of methods and working procedures of other authors or author groups; 4. Compliance of the structure of the final work with the prescribed composition defined by Internal Regulation no. 12/2013; 5. Respecting the recommended scope of the final thesis (the recommended scope of the diploma thesis is usually 50 - 70 standard pages - 90,000 to 126,000 characters, including spaces), the adequacy of the scope of the thesis is assessed by its supervisor; 6. Linguistic and stylistic level of work and formal arrangement; 7. The method and form of the defense of the final thesis and the student's ability to adequately respond to comments and questions in the opinions of the supervisor and the opponent. 8. In the teaching of art-educational subjects, the final work and its defense may also include the presentation of artistic outputs and performances.	
State exam syllabus:	
Recommended literature: According to the topic of the master thesis.	
Languages necessary to complete the course:	

Slovak, English

Last change: 22.06.2022

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFLKDMFI+KAG/2- UXX-939/22	Course title: Diploma Thesis Seminar
Educational activities: Type of activities: seminar Number of hours: per week: 3 per level/semester: 39 Form of the course: on-site learning	
Number of credits: 3	
Recommended semester: 3.	
Educational level: II.	
Prerequisites:	
Course requirements: Active participation, ongoing reporting on work on the thesis. A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 100/0	
Learning outcomes: Definition of the thesis topic, overview of the current state of problem solving, choice of the theoretical-methodological concept of the thesis and the ability to work selectively and correctly with secondary literature.	
Class syllabus: Choice of thesis topic. Review of literature on the topic. Basic material research and the procedure of its processing. Methods of processing and producing the thesis (citation standards, manuscript editing, note-taking apparatus). Presentation of a partial output (e.g. in the form of one chapter of the thesis).	
Recommended literature: Selection of literature according to the chosen topic of the thesis; The current directive of the Rector of Comenius University on the basic requirements of theses; KATUŠČÁK, D.: Ako písať záverečné a kvalifikačné práce. Nitra: Enigma 2007.	
Languages necessary to complete the course: Slovak, English	
Notes:	

Past grade distribution						
Total number of evaluated students: 64						
A	ABS	B	C	D	E	FX
92,19	0,0	3,13	1,56	1,56	1,56	0,0
Lecturers: prof. RNDr. Zuzana Kubincová, PhD., doc. RNDr. Pavel Chalmovianský, PhD., doc. PaedDr. Peter Vankúš, PhD., doc. PaedDr. Klára Velmovská, PhD., prof. RNDr. Ivan Kalaš, PhD., Mgr. Jana Havlíčková, PhD., Mgr. Marcel Makovník, PhD.						
Last change: 22.08.2022						
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.						

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFL.KDMFI+KAG/2- UXX-940/22	Course title: Diploma Thesis Seminar (1)
Educational activities: Type of activities: seminar Number of hours: per week: 3 per level/semester: 39 Form of the course: on-site learning	
Number of credits: 3	
Recommended semester: 2.	
Educational level: II.	
Prerequisites:	
Course requirements: active participation in the seminar, on time submission of assignments and presentation of preliminary results A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 100/0	
Learning outcomes: The graduate of the course is able to obtain and sort information from information sources, especially from monographs, journal articles, conference proceedings and university textbooks. The graduate is able to plan research in the area of the thesis.	
Class syllabus: Formulating the objectives of the thesis on the basis of its assignment; obtaining, sorting and using available resources; working with electronic information sources; formulating research questions, searching for research methods suitable for the topic of the thesis.	
Recommended literature: Creswell JW. Educational research: Planning, conducting, and evaluating quantitative. Prentice Hall Upper Saddle River, NJ; 2002. Sources listed in the thesis assignment. Sources available in databases (e.g. wos, scopus, researchgate). Textbook on research methodology in science teaching recommended by the thesis supervisor.	
Languages necessary to complete the course: Slovak, English	
Notes:	

Past grade distribution					
Total number of evaluated students: 54					
A	B	C	D	E	FX
96,3	0,0	0,0	0,0	1,85	1,85
Lecturers: doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Zuzana Kubincová, PhD., doc. PaedDr. Klára Velmovská, PhD., doc. RNDr. Pavel Chalmovianský, PhD., doc. PaedDr. Peter Vankúš, PhD., RNDr. Martina Bátorová, PhD.					
Last change: 20.06.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFLKDMFI+KAG/2- UXX-941/22		Course title: Diploma Thesis Seminar (2)			
Educational activities: Type of activities: seminar Number of hours: per week: 4 per level/semester: 52 Form of the course: on-site learning					
Number of credits: 4					
Recommended semester: 4.					
Educational level: II.					
Prerequisites:					
Course requirements: Active participation, ongoing reporting on work on the thesis. A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 100/0					
Learning outcomes: The graduate is able to elaborate the chosen topic at the level of a scientific study with a representative selection of literature, with appropriately chosen scientific procedures and hypotheses that can be verified. The graduate is able to formulate the contribution of his/her own work in the field of informatics/mathematics/physics teaching.					
Class syllabus: Development of argumentation skills, causal thinking and creativity in the area of the thesis topic. Development of abilities to present the results of own work in the field of the thesis topic.					
Recommended literature: Creswell JW. Educational research: Planning, conducting, and evaluating quantitative. Prentice Hall Upper Saddle River, NJ; 2002. Sources listed in the thesis assignment. Sources available in databases (e.g. wos, scopus, researchgate). Textbook on research methodology in science teaching recommended by the thesis supervisor.					
Languages necessary to complete the course: Slovak, English					
Notes:					
Past grade distribution Total number of evaluated students: 36					
A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. PaedDr. Mária Slavičková, PhD., doc. RNDr. Peter Demkanin, PhD., prof. RNDr. Zuzana Kubincová, PhD., doc. RNDr. Pavel Chalmovianský, PhD., doc. PaedDr. Peter Vankúš, PhD., RNDr. Martina Bátorová, PhD.

Last change: 20.06.2022

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFLKDMFI+KEF/2- UFY-212/22		Course title: Electronics and Communication for Teachers			
Educational activities: Type of activities: lecture Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 3.					
Educational level: II.					
Prerequisites:					
Course requirements: Continuous assessment: individual work (30 marks), evaluation of micro-outputs at the seminar (2x15 marks) Exam: test (20 marks), presentation of individual work results (20 marks) Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50% Credits will not be awarded if a student scores less than 50%.					
Learning outcomes: The graduate will understand the basic concepts of electronics, signal digitization and the physical nature of information transmission. The graduate will know the ways of including topics from the physical foundations of communication and electronics in the curriculum of primary and secondary schools in the selected foreign education system.					
Class syllabus: Implementation of simple experiments using basic electronic components. Analysis of possible directions of expansion and updating of the content of the current curriculum of physics of primary and secondary school in the field of electromagnetism (electromagnetic waves and signal transmission), optics (optical fibers) circuits with electric current (classification of electronic elements).					
Recommended literature:					
Languages necessary to complete the course: Slovak and English.					
Notes:					
Past grade distribution Total number of evaluated students: 75					
A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. RNDr. František Kundracik, CSc., PaedDr. Lukáš Bartošovič, PhD.

Last change: 18.06.2022

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFI.KAI/2-MXX-130/21		Course title: Elements of AI			
Educational activities: Type of activities: independent work Number of hours: per week: 25 per level/semester: 325 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 2., 8.					
Educational level: I.II., II.					
Prerequisites:					
Course requirements: Passing the online course https://course.elementsofai.com/ (in English or Slovak version).					
Learning outcomes: The student will get acquainted with selected basic concepts of artificial intelligence and their use in solving various practical tasks.					
Class syllabus: <ol style="list-style-type: none"> 1. What is artificial intelligence: related areas, AI philosophy. 2. Troubleshooting and UI: Browsing and troubleshooting, browsing and games 3. Probability and chance, Bayes' theorem, naive Bayesian classification. 4. Machine learning: nearest neighbor classifier, regression. 5. Neural networks: basics, creation, modern techniques. 6. Consequences: on predicting the future, the effects of AI on society, summary. 					
Recommended literature: Russell S., Norwig P. (2010). Artificial Intelligence: A Modern Approach, (3rd ed.), Prentice Hall. Available in faculty library. Marsland S. (2015). Machine Learning: An Algorithmic Perspective, (2nd ed.), CRC Press.					
Languages necessary to complete the course: Slovak or English					
Notes: The course consists of 20 numerical and 5 text-based tasks. Numerical tasks are checked automatically, text-based tasks are evaluated anonymously by students.					
Past grade distribution Total number of evaluated students: 95					
A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. RNDr. Mária Markošová, PhD., prof. Ing. Igor Farkaš, Dr., doc. RNDr. Martin Takáč, PhD.

Last change: 22.08.2021

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFI.KAI/2-MXX-130/21		Course title: Elements of AI			
Educational activities: Type of activities: independent work Number of hours: per week: 25 per level/semester: 325 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 1., 7.					
Educational level: I.II., II.					
Prerequisites:					
Course requirements: Passing the online course https://course.elementsofai.com/ (in English or Slovak version).					
Learning outcomes: The student will get acquainted with selected basic concepts of artificial intelligence and their use in solving various practical tasks.					
Class syllabus: <ol style="list-style-type: none"> 1. What is artificial intelligence: related areas, AI philosophy. 2. Troubleshooting and UI: Browsing and troubleshooting, browsing and games 3. Probability and chance, Bayes' theorem, naive Bayesian classification. 4. Machine learning: nearest neighbor classifier, regression. 5. Neural networks: basics, creation, modern techniques. 6. Consequences: on predicting the future, the effects of AI on society, summary. 					
Recommended literature: Russell S., Norwig P. (2010). Artificial Intelligence: A Modern Approach, (3rd ed.), Prentice Hall. Available in faculty library. Marsland S. (2015). Machine Learning: An Algorithmic Perspective, (2nd ed.), CRC Press.					
Languages necessary to complete the course: Slovak or English					
Notes: The course consists of 20 numerical and 5 text-based tasks. Numerical tasks are checked automatically, text-based tasks are evaluated anonymously by students.					
Past grade distribution Total number of evaluated students: 95					
A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0
Lecturers: doc. RNDr. Mária Markošová, PhD.					

Last change: 22.08.2021

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KJP/1-MXX-233/13		Course title: English Conversation Course (1)			
Educational activities: Type of activities: practicals Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 1., 3., 7., 9.					
Educational level: I., I.II., II.					
Prerequisites:					
Course requirements: tests, presentations, essays Course prerequisites: https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/ Scale of assessment (preliminary/final): 100/0					
Learning outcomes: Continual improvement of all language skills focused on communication/speaking, listening comprehension and writing. The emphasis is on discourse, lexicology and morphology, word-bank broadening of communicational English as well as English for specific purposes appropriate for university students. This course is a follow up of the previously taught ESP course.					
Class syllabus: This course's focus is to broaden spoken/communicational English for students with B2/C1 level of English knowledge.					
Recommended literature: Appropriate study material is supplied based on the participants' level of English by the lecturer. (Sources- The Guardian, The Herald Morning Sun. The Nine News, The West Australian, BBC News and podcasts, CNN podcasts).					
Languages necessary to complete the course:					
Notes:					
Past grade distribution Total number of evaluated students: 318					
A	B	C	D	E	FX
77,36	8,81	4,4	1,26	0,94	7,23
Lecturers: Mgr. Aneta Barnes					

Last change: 11.04.2024

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KJP/1-MXX-234/13		Course title: English Conversation Course (2)			
Educational activities: Type of activities: practicals Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 2., 4., 8., 10.					
Educational level: I., I.II., II.					
Prerequisites:					
Course requirements: tests, oral presentations, essays Course prerequisites: https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/ Scale of assessment (preliminary/final): 100/0					
Learning outcomes: Continual improvement of all language skills focused on communication/speaking, listening comprehension and writing. The emphasis is on discourse, lexicology and morphology, word-bank broadening of communicational/spoken English as well as English for specific purpose appropriate for university students. This course is a follow up of the Conversational English course 1.					
Class syllabus: This course's focus is to broaden spoken/communicational English for students with B2/C1 level of English knowledge(Upper-Intermediate/Lower Advanced).					
Recommended literature: Appropriate study material is supplied based on the participants' level of English by the lecturer. (Sources- The Guardian, The Herald Morning Sun. The Nine News, The West Australian, BBC News and podcasts, CNN podcasts).					
Languages necessary to complete the course:					
Notes:					
Past grade distribution Total number of evaluated students: 201					
A	B	C	D	E	FX
82,09	8,96	2,49	1,0	0,0	5,47
Lecturers: Mgr. Aneta Barnes					

Last change: 11.04.2024

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KDMFI/2-UFY-242/22		Course title: Environmental Physics for Teachers			
Educational activities: Type of activities: course Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 3.					
Educational level: II.					
Prerequisites:					
Course requirements: Each student will present a separate paper during the semester. Outputs are assessed. In particular, the correctness of the physical information used is assessed (70%). Assessment of peers is for 30%. Indicative rating scale: A 90%, B 80%, C 70%, D 60%, E 50%. Credits will not be awarded if the student scores less than 50%.					
Learning outcomes: Graduates will be acquainted with the laws of physics and regularities that are related to environmental problems, focusing in particular on current environmental problems and alternative energy sources.					
Class syllabus: Solar constant, global climate change. Conventional and alternative energy sources. Lighting, light smog.					
Recommended literature:					
Languages necessary to complete the course: Slovak and English.					
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: PaedDr. Peter Horváth, PhD.					
Last change: 18.06.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFLKDMFI/2-UXX-131/22	Course title: Financial Literacy for Everyone
Educational activities: Type of activities: seminar Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning	
Number of credits: 2	
Recommended semester: 1.	
Educational level: II.	
Prerequisites:	
Course requirements: Continuous assessment: active participation in seminars / elaboration of assignments An exam: Indicative evaluation scale: e.g. A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 100/0	
Learning outcomes: The student: - knows the target requirements for a financially literate student - propose activities and be able to assess their suitability - can solve and prepare his / her own tasks in every topic of financial literacy.	
Class syllabus: - National standard financial literacy - Origin and development of money; - Financial responsibility of consumers; - Planning, receiving and working; - Consumer decision-making and management; - Credit and debt; - Saving and investing; - Risk management and insurance;	
Recommended literature: FFinancie v praxi A / Peter Tóth, Monika Dillingerová, Bratislava : ABCedu, a.s. 2019 Financie v praxi B / Peter Samuel Tóth, Monika Dillingerová, Bratislava : ABCedu, a.s. 2021, Financie v praxi C / Peter Samuel Tóth, Monika Dillingerová, Bratislava : ABCedu, a.s. will be printed soon my own electronic texts published on a website in LMS Moodle	
Languages necessary to complete the course: slovak	

Notes:					
Past grade distribution					
Total number of evaluated students: 59					
A	B	C	D	E	FX
98,31	0,0	0,0	0,0	0,0	1,69
Lecturers: RNDr. Monika Dillingerová, PhD.					
Last change: 17.03.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KJP/1-MXX-141/00		Course title: French Language (1)			
Educational activities: Type of activities: practicals Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 1., 7.					
Educational level: I., I.II., II.					
Prerequisites:					
Course requirements: Scale of assessment (preliminary/final): 100/0					
Learning outcomes:					
Class syllabus: French language is taught at two levels: beginner and intermediate. Students opt for one of them depending on whether they wish to obtain the fundamentals of the language or wish to maintain and/or improve previous knowledge of French.					
Recommended literature: Capelle Guy, Menand Robert: Le Nouveau taxi 1, Hachette FLE Paris, France 2009, ISBN 978-2-01-155548 - 9					
Languages necessary to complete the course:					
Notes:					
Past grade distribution Total number of evaluated students: 499					
A	B	C	D	E	FX
48,5	19,44	16,63	7,82	2,0	5,61
Lecturers: Mgr. Ľubomíra Kožehubová					
Last change: 20.06.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KJP/1-MXX-142/00		Course title: French Language (2)			
Educational activities: Type of activities: practicals Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 2., 8.					
Educational level: I., I.II., II.					
Prerequisites:					
Course requirements: Scale of assessment (preliminary/final): 100/0					
Learning outcomes:					
Class syllabus: The subject continues the program of French language (1) and provides courses of essential and intermediate French language.					
Recommended literature: Capelle Guy, Menand Robert: Le Nouveau taxi 1, Hachette FLE Paris, France 2009, ISBN 978-2-01-155548 - 9					
Languages necessary to complete the course:					
Notes:					
Past grade distribution Total number of evaluated students: 307					
A	B	C	D	E	FX
45,6	22,48	16,94	8,79	2,28	3,91
Lecturers: Mgr. Ľubomíra Kožehubová					
Last change: 20.06.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KJP/1-MXX-241/00		Course title: French Language (3)			
Educational activities: Type of activities: practicals Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 3., 9.					
Educational level: I., I.II., II.					
Prerequisites:					
Course requirements: Scale of assessment (preliminary/final): 100/0					
Learning outcomes:					
Class syllabus: The subject provides a course of intermediate French language, covering not only general, but also technical language.					
Recommended literature: Capelle Guy, Menand Robert: Le Nouveau taxi 1, Hachette FLE Paris, France 2009, ISBN 978-2-01-155548 - 9					
Languages necessary to complete the course:					
Notes:					
Past grade distribution Total number of evaluated students: 128					
A	B	C	D	E	FX
48,44	24,22	17,19	5,47	0,78	3,91
Lecturers: Mgr. Ľubomíra Kožehubová					
Last change: 20.06.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KJP/1-MXX-242/00		Course title: French Language (4)			
Educational activities: Type of activities: practicals Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 4., 10.					
Educational level: I., I.II., II.					
Prerequisites:					
Course requirements: Scale of assessment (preliminary/final): 100/0					
Learning outcomes:					
Class syllabus: The subject provides a course of intermediate French covering not only general, but also technical French language.					
Recommended literature: Menand Robert: Le Nouveau taxi 2, Hachette FLE, Paris, France 2009, ISBN 978-2-01-155551 - 9					
Languages necessary to complete the course:					
Notes:					
Past grade distribution Total number of evaluated students: 79					
A	B	C	D	E	FX
43,04	32,91	16,46	2,53	1,27	3,8
Lecturers: Mgr. Ľubomíra Kožehubová					
Last change: 20.06.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KJP/1-MXX-151/00		Course title: German Language (1)			
Educational activities: Type of activities: practicals Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 1., 7.					
Educational level: I., I.II., II.					
Prerequisites:					
Course requirements: Scale of assessment (preliminary/final): 100/0					
Learning outcomes: To master the fundamentals of the common language and basic technical terms of particular fields of study (depending on the student's level of German proficiency)					
Class syllabus: German language is taught at three levels: beginner, intermediate and advanced. Students opt for one of them depending on whether they need to learn the fundamentals or maintain and/or improve their previous knowledge. This course's focus is to master the fundamentals of the common language and basic technical terms of particular fields of study (depending on the student's level of German proficiency)					
Recommended literature: Appropriate study material is supplied by teacher based on the participants' level of German proficiency.					
Languages necessary to complete the course:					
Notes:					
Past grade distribution Total number of evaluated students: 874					
A	B	C	D	E	FX
38,33	24,71	18,42	8,81	2,86	6,86
Lecturers: Mgr. Alexandra Maďarová, Mgr. Simona Dobiašová, PhD.					
Last change: 05.09.2025					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KJP/1-MXX-152/00		Course title: German Language (2)			
Educational activities: Type of activities: practicals Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 2., 8.					
Educational level: I., I.II., II.					
Prerequisites:					
Course requirements: Scale of assessment (preliminary/final): 100/0					
Learning outcomes: To master the fundamentals of the common language and basic technical terms of particular fields of study (depending on the student's level of German proficiency)					
Class syllabus: German language is taught at two levels: beginner and intermediate. Students opt for one of them depending on whether they wish to obtain the fundamentals of the language or wish to maintain and/or improve previous knowledge of German. This course's focus is to to master the fundamentals of the common language and basic technical terms of particular fields of study (depending on the student's level of German proficiency)					
Recommended literature: Appropriate study material is supplied by teacher based on the participants' level of German proficiency					
Languages necessary to complete the course:					
Notes:					
Past grade distribution Total number of evaluated students: 542					
A	B	C	D	E	FX
38,01	19,56	19,56	12,36	3,51	7,01
Lecturers: Mgr. Alexandra Maďarová, Mgr. Simona Dobiašová, PhD.					
Last change: 05.09.2025					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KJP/1-MXX-251/00		Course title: German Language (3)			
Educational activities: Type of activities: practicals Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 3., 9.					
Educational level: I., I.II., II.					
Prerequisites:					
Course requirements: Scale of assessment (preliminary/final): 100/0					
Learning outcomes: Master the basics of general language and basic professional terminology of individual fields of study (depending on the advanced level of students)					
Class syllabus: The course is a follow-up to the German language (1,2). The subject provides a course of intermediate or advanced German language. This course's focus is to deepen the knowledge of the common language and basic technical terms of particular fields of study (depending on the student's level of German proficiency).					
Recommended literature: Appropriate study material is supplied by teacher based on the participants' level of German proficiency.					
Languages necessary to complete the course:					
Notes:					
Past grade distribution Total number of evaluated students: 191					
A	B	C	D	E	FX
45,03	23,04	19,37	6,81	2,09	3,66
Lecturers: Mgr. Alexandra Maďarová, Mgr. Simona Dobiašová, PhD.					
Last change: 05.09.2025					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KJP/1-MXX-252/00		Course title: German Language (4)			
Educational activities: Type of activities: practicals Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 4., 10.					
Educational level: I., I.II., II.					
Prerequisites:					
Course requirements: Scale of assessment (preliminary/final): 100/0					
Learning outcomes: Master the basics of general language and basic professional terminology of individual fields of study (depending on the advanced level of students)					
Class syllabus: The course is a follow-up to the German language (1-3). It provides a course of intermediate and advanced German language. This course's focus is to deepen the knowledge of the common language and basic technical terms of particular fields of study (depending on the student's level of German proficiency).					
Recommended literature: Appropriate study material is supplied by teacher based on the participants' level of German proficiency.					
Languages necessary to complete the course:					
Notes:					
Past grade distribution Total number of evaluated students: 104					
A	B	C	D	E	FX
44,23	22,12	14,42	10,58	3,85	4,81
Lecturers: Mgr. Alexandra Maďarová, Mgr. Simona Dobiašová, PhD.					
Last change: 05.09.2025					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFLCENAM/2- MXX-134/26	Course title: Innovation and Entrepreneurship in Natural and Technical Sciences
Educational activities: Type of activities: lecture / independent work Number of hours: per week: 2 / 1 per level/semester: 26 / 13 Form of the course: on-site learning	
Type, volume, methods and workload of the student - additional information 2/1 (lecture / individual work)	
Number of credits: 3	
Recommended semester: 1., 7.	
Educational level: I.II., II.	
Prerequisites:	
Course requirements: The condition for admission to the exam is active participation in at least 80% of the lessons. The final assessment consists of a presentation of the semester project. To successfully complete the course, it is necessary to achieve at least 50% of the overall score. Scale of assessment (preliminary/final): 0/100	
Learning outcomes: After completing the course, students can describe the possibilities for commercialization of scientific and technological research. They can identify market needs, assess the market potential of a technological solution, and are familiar with the terminology of entrepreneurship, technology transfer, and intellectual property protection. They understand the overall structure of a business plan and the main forms of financing for technological projects. They are familiar with the principles of communication, teamwork, and team leadership and can apply them appropriately in project work and its presentation.	
Class syllabus: 1. Commercialization of scientific research. 2. Fundamentals of entrepreneurship and startup terminology. 3. Identification of problems and customer needs analysis (design thinking). 4. Technology transfer. Technology Readiness Levels (TRL). 5. Intellectual property and its protection. 6. Market, customer, and market potential of a technological solution. 7. Business Model Canvas. Revenue models. 8. Sources of financing for technological projects. 9. Pitching and communication of the solution. 10. Fundamentals of management and leadership. 11. Innovation support and incubation structures at national and international levels.	

Recommended literature: Clark, Timothy R., et al. Business Model Generation. Wiley, 2010					
Languages necessary to complete the course: Slovak					
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. Tomáš Plecenik, PhD., Mgr. Veronika Hidaši Turiničová, PhD.					
Last change: 13.03.2026					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFLKDMFI+KAI/2- MXX-131/21	Course title: International Team-based Research Project
Educational activities: Type of activities: course / independent work Number of hours: per week: 3 per level/semester: 39 / 30s Form of the course: on-site learning	
Number of credits: 5	
Recommended semester: 1., 7.	
Educational level: I.II., II.	
Prerequisites:	
Course requirements: Continuous assessment: active participation in research in an international student team (25%), presentation of work in a workshop (25%), scientific article (50%) Indicative evaluation scale: A 90 %, B 80 %, C 70 %, D 60 %, E 50 % Scale of assessment (preliminary/final): 100/0	
Learning outcomes: Students will learn in the team to agree on a common research topic, formulate research questions, determine research methods for the problem, collect and evaluate data, discuss their findings, present research results to the professional public, analyze and evaluate the scientific work of their colleagues, prepare a scientific article suitable for publication	
Class syllabus: - Research methodology - Design and implementation of a research project in an international group (preferably interdisciplinary) - Methods and tools for collaboration in virtual space, collaboration in science and practice - Academic writing, presentation of research results through scientific articles; objectives, content and structure of scientific articles; forms of academic publication, publication forums and evaluation of their quality - Quality assurance and feedback - peer review - Communication of results through posters or conference presentations	
Recommended literature: - Teachers' own electronic study materials published on the course website or in the Moodle system - Gavora, Peter a kol. 2010. Elektronická učebnica pedagogického výskumu. [online]. Bratislava : Univerzita Komenského, 2010. Dostupné na: http://www.e-metodologia.fedu.uniba.sk/ ISBN 978-80-223-2951-4.	

<ul style="list-style-type: none"> - Tharenou, P., Donohue, R. and Cooper, B., 2007. Management research methods. Cambridge University Press. - Topping, A., 2015: The Quantitative-Qualitative Continuum. In: Gerrish, K. and Lathlean, J., The Research Process in Nursing, p. 159-172 - Williamson, K. and Johanson, G. eds., 2017. Research methods: Information, systems, and contexts. Chandos Publishing. 					
Languages necessary to complete the course: English					
Notes:					
Past grade distribution Total number of evaluated students: 10					
A	B	C	D	E	FX
70,0	0,0	0,0	0,0	30,0	0,0
Lecturers: prof. RNDr. Zuzana Kubincová, PhD., doc. RNDr. Martin Homola, PhD.					
Last change: 22.06.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFI.KAG/2-UMA-164/22		Course title: Introduction to Graph Theory			
Educational activities: Type of activities: course Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 2.					
Educational level: II.					
Prerequisites:					
Antirequisites: FMFI.KAG+KI/2-UMA-164/15					
Course requirements: Preliminary evaluation: homeworks Exam: oral Indicative evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 50/50					
Learning outcomes: Students will get acquainted with basic concepts of graph theory. At the same time, they will learn to transform different types of problems into graph theory problems and solve them algorithmically.					
Class syllabus: Some basic concepts and results from graph theory, searching graphs reachability and connectivity, trees and spanning trees, planar graphs, hard problems in graph theory.					
Recommended literature: Grafové algoritmy / Ján Plesník. Bratislava : Veda, 1983 Grafy a jejich aplikace / Jiří Demel, Academia, 2002 Konec záhady hlavolamů / Stanislav Vejmla, SPN 1989					
Languages necessary to complete the course: slovak,english					
Notes:					
Past grade distribution Total number of evaluated students: 8					
A	B	C	D	E	FX
25,0	12,5	0,0	37,5	25,0	0,0
Lecturers: doc. RNDr. Martin Mačaj, PhD.					
Last change: 14.03.2022					

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFLKDMFI/2-UMA-218/11	Course title: Mathematical Background of Music
Educational activities: Type of activities: seminar Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning	
Number of credits: 2	
Recommended semester: 3.	
Educational level: II.	
Prerequisites:	
Course requirements: Continuous assessment: individual work of students, project Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 100/0	
Learning outcomes: By completing the course, the student will deepen and combine knowledge of basic mathematics courses in bachelor's studies in the study program mathematics teacher preparation in combination, build on knowledge of mathematics didactics and broaden horizons in the context of creating lessons using interdisciplinary relationships.	
Class syllabus: Selected parts of music theory from the point of view of mathematics, connection to mathematics from lower secondary school to university, related to the teaching of mathematics, preparation of interdisciplinary projects and activities for direct inclusion in teaching and leisure activities.	
Recommended literature: Mathematics and Art / Bruter (Ed.), Springer Hudba ako zdroj námetov vo vyučovaní matematiky / M. Slavičková, In. Matematika, informatika, fyzika. Roč. 21, č. 38 (2012), s. 3-8. ISSN 1335-7794 Chladniho obrazce / E. Dubajová, (časť diplomovej práce), dostupné na https://wilma.sk/dokumenty/ef0ed9b0f05bd757ddcf91b96794b0cf/show The Science of Sound / T. D. Rossing, R. F. Moore, P. A. Wheeler, 3. vyd., Pearson, 2014 Music: A Mathematical Offering / D. Benson, Department of Mathematics, Meston Building, University of Aberdeen, UK. 2008	
Languages necessary to complete the course: slovak, english	
Notes: To complete the course, it is recommended to have at least a basic knowledge of music theory (min. of 2 years music school)	

Past grade distribution					
Total number of evaluated students: 19					
A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0
Lecturers: doc. PaedDr. Mária Slavičková, PhD.					
Last change: 17.03.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFLKDMFI/2-UXX-125/22	Course title: Methodology of Pedagogical Research
Educational activities: Type of activities: lecture / seminar Number of hours: per week: 2 / 2 per level/semester: 26 / 26 Form of the course: on-site learning	
Number of credits: 4	
Recommended semester: 1.	
Educational level: II.	
Prerequisites:	
Course requirements: Attendance at lectures is not necessary, but recommended. (20%) The exercises evaluate active work, solving tasks such as. coding, analysis and data collection, etc. and solving beds at home. (60%) The course is completed by a research project (20%) The condition for successful completion of the course is to obtain at least 60% of the maximum possible evaluation of the course. The rating is given on a scale: A (100-91%, excellent - excellent results), B (90-81%, very good - above average standard), C (80-73%, good - normal reliable work), D (72-66%, satisfactory - acceptable results), E (65-60%, sufficient - results meet minimum criteria), Fx (59-0%, insufficient - additional work required) Scale of assessment (preliminary/final): 80/20	
Learning outcomes: At the end of the semester, students will receive: Knowledge of basic stages and methods of empirical research of educational phenomena, basic methodological concepts, stages, methods and principles of quantitative and qualitative pedagogical research. Skills needed to study and analyze scientific studies in pedagogy. The teacher is able to design his / her own educational research, survey or action research and, with the support of the trainer, to carry out an independent research effort. Ability to choose appropriate and meaningful research topics, deftly develop a research project, collect and empirically correct analysis of research data. They can interpret, defend and publish research data meaningfully and creatively. Ability to critically evaluate various pedagogical researches, their implementation and their results. They can create and choose the right type of research, with regard to solving a problem in the teaching process. They are able to create, implement and evaluate a test of knowledge and skills, according to the rules of creation and with regard to educational goals.	

Class syllabus:

Research of educational phenomena. Action research as a specific professional activity of a teacher. Stages of empirical educational research. Procedures and techniques of research of educational phenomena (experiment, observation, scales and scaling, interview, questionnaire, sociometry and measurement of social climate, method of content analysis of school documents).

Qualitative research (characteristics, principles, use), collection of qualitative data (tools, conditions, tool creation), processing and interpretation of qualitative data (transcription, coding, theory creation, use), quantitative research (characteristics, principles, use), collection of quantitative data data (tools, conditions, tool creation), processing and analysis of quantitative data. (statistical methods, types, application, use), objectivity, reliability and validity of research, designs of qualitative, quantitative and mixed pedagogical research

Recommended literature:

PROKŠA, M., HELD, L. et al. : Methodology of pedagogical research and its application in didactics of natural sciences. Bratislava: Comenius University, 2008.
 CHRÁSKA, M. : Methods of pedagogical research. Prague, Grada, 2007.
 SILVERMAN, D. : How to do qualitative research. Bratislava, Ikar, 2005.
 GAVORA, P. : Introduction to pedagogical research. Bratislava: UK, 1996, 1999, 2001, 2008.
 GAVORA, P. : A Guide to Qualitative Research Methodology. Bratislava: UK, 2007.
 MAŇÁK, J. - ŠVEC, V. : Ways of pedagogical research. Brno: Paido, 2004.
 PELIKÁN, J. : Basics of empirical research of pedagogical phenomena. Prague: Karolinum, 1998, 2004, 2007.
 ŠVEC, Š. et al. : Methodology of educational sciences. Quantitative-scientific and qualitative-humanities approaches. Bratislava: Iris, 1996. 2nd ed. Brno: Paido, 2009.
 GAVORA, P. et al. 2010. Electronic textbook of pedagogical research methodology. (Online). Bratislava: Comenius University in Bratislava, 2010. Available online. ISBN 978-80-223-2951-4.
 STRAUSS, A., CORBINOVÁ, J. 1999. Basics of qualitative research. Procedures and techniques of grounded theory. Boskovice: Nakladatelství Albert, 1999, 196p. ISBN 80-85834-60-X.
 ŠEĐOVÁ, K., ŠVAŘÍČEK, R., 2007. Qualitative research in pedagogical sciences. Prague: Portal, 2007, 377 p. ISBN 978-80-7367-313-0.
 ŠVAŘÍČEK, R - ŠEĐOVÁ, K .. et al. : Qualitative research in pedagogical sciences. Game rules. Prague: Portal, 2007
 J.W. CRESWELL: Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research: International Edition. Pearson Education (US) 2011
 J.W. CRESWELL, V.L. Plano CLARK. : Designing and Conducting Mixed Methods Research. SAGE Publications Inc, 2017

Languages necessary to complete the course:

Slovak

Notes:**Past grade distribution**

Total number of evaluated students: 203

A	B	C	D	E	FX
68,97	15,76	6,9	3,94	1,48	2,96

Lecturers: doc. Mgr. Karolína Miková, PhD., PaedDr. Tünde Kozánek Kiss, PhD.

Last change: 22.06.2022

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFLKDMFI/2-UMA-257/15	Course title: Methods for Solving Mathematical Tasks (1)
Educational activities: Type of activities: seminar Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning	
Number of credits: 2	
Recommended semester: 1.	
Educational level: II.	
Prerequisites:	
Course requirements: Continuous assessment: Homework - individual work of students Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 100/0	
Learning outcomes: After completing the course, students will master methods of solving various mathematical tasks from the curriculum of lower and upper secondary school and will be able to apply these methods in the teaching of mathematics.	
Class syllabus: Generally about solving mathematical tasks, basic methods of solving mathematical tasks –patterns identification and conclusion making, figural approaches to solving, formulating equivalent problems, modifying the problem, choosing effective marking, using symmetry, dividing the problem into several special cases, reverse procedure, indirect procedure, use of parity, mathematical induction, Dirichlet (Pigeon) principle.	
Recommended literature: Metódy riešenia matematických problémov / L. C. Larson ; from the American original translated by Jaroslav Smítal. Bratislava : Alfa, 1990 Metódy riešenia matematických úloh / Tomáš Hecht, Zita Sklenáriková. Bratislava : Slovenské pedagogické nakladateľstvo, 1992 Tasks from Mathematical Olympiad and Mathematical correspondence seminars	
Languages necessary to complete the course: Slovak, English	
Notes:	

Past grade distribution					
Total number of evaluated students: 198					
A	B	C	D	E	FX
89,39	4,55	1,01	0,51	0,51	4,04
Lecturers: doc. PaedDr. Peter Vankúš, PhD., Mgr. Emília Miřková, PhD.					
Last change: 17.03.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slaviřková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFLKDMFI/2-UMA-258/15		Course title: Methods for Solving Mathematical Tasks (2)			
Educational activities: Type of activities: seminar Number of hours: per week: 3 per level/semester: 39 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 2.					
Educational level: II.					
Prerequisites:					
Course requirements: Continuous assessment: Homework - individual work of students Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 100/0					
Learning outcomes: After completing the course, students will master methods of solving various mathematical tasks from the curriculum of lower and upper secondary school and will be able to apply these methods in the teaching of mathematics.					
Class syllabus: Equations, inequalities, systems of equations and inequalities, sets of points of given properties, analytical geometry, construction tasks, planimetric tasks, stereometric tasks, inequalities in geometry, number theory, diophantic equations, combinatorial geometry, sequences, recurrent relationships, trigonometry and complex numbers, probability.					
Recommended literature: Metódy riešenia matematických problémov / L. C. Larson ; from the American original translated by Jaroslav Smítal. Bratislava : Alfa, 1990 Metódy riešenia matematických úloh / Tomáš Hecht, Zita Sklenáriková. Bratislava : Slovenské pedagogické nakladateľstvo, 1992 Tasks from Mathematical Olympiad and Mathematical correspondence seminars					
Languages necessary to complete the course: Slovak, English					
Notes:					
Past grade distribution Total number of evaluated students: 114					
A	B	C	D	E	FX
94,74	2,63	0,88	0,0	0,0	1,75

Lecturers: Mgr. Emília Miťková, PhD., doc. PaedDr. Peter Vankúš, PhD.

Last change: 17.03.2022

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFLKDMFI/2-UFY-115/15		Course title: Methods for Solving Physics Problems			
Educational activities: Type of activities: seminar Number of hours: per week: 3 per level/semester: 39 Form of the course: on-site learning					
Number of credits: 3					
Recommended semester: 2.					
Educational level: II., N					
Prerequisites:					
Course requirements: Continuous assessment: homeworks (4x10 marks), discussions (3x10 marks), tests (2x15 marks). Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50% Credits will not be awarded if a student scores less than 50%.					
Learning outcomes: The graduate will know several forms of physical problems, selected methods of assigning and solving physical problems and methods of evaluating students' solutions to physical problems. Will be able to actively use physics tasks in secondary school.					
Class syllabus: Physics task, physics problem. Assignment. The general plan of the process of solving. Modelling in solving a physical problem. Mathematization of the task situation. Graphic and numerical solution of the problem. Dynamic modelling method. Solution methods using computer programs and audiovisual means. Solution methods using the system of computer-assisted science laboratory Coach.					
Recommended literature:					
Languages necessary to complete the course: Slovak and English.					
Notes:					
Past grade distribution Total number of evaluated students: 87					
A	B	C	D	E	FX
89,66	5,75	4,6	0,0	0,0	0,0
Lecturers: doc. PaedDr. Klára Velmovská, PhD.					
Last change: 18.06.2022					

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof.
RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFLKDMFI/2-UFY-246/22		Course title: Methods of School Experiment			
Educational activities: Type of activities: course Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 4.					
Educational level: II.					
Prerequisites:					
Course requirements: During the semester, students will prepare five written preparations and make at least five micro-presentations. (5x20 marks) Rating: A = (90, 100]%, B = (80, 90]%, C = (70, 80]%, D: (60, 70]%, E: (50, 60]%. Credits will not be awarded if a student scores less than 50%.					
Learning outcomes: After completing the course, the student will be prepared for active management planning and support of empirical physics cognition by high school students. He will be able to appropriately select and implement activities with students in the field of observation, measurement and physics experiments.					
Class syllabus: Demonstrations, school experiments and experiments on the topics of force and motion, periodic events, mechanical oscillations and waves, rigid body mechanics, fluid mechanics, hydrostatics.					
Recommended literature:					
Languages necessary to complete the course: Slovak and 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. PaedDr. Viera Haverlíková, PhD.					
Last change: 18.06.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KDMFI/2-UMA-114/22		Course title: Non-traditional Forms of Teaching			
Educational activities: Type of activities: seminar Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 2.					
Educational level: II., N					
Prerequisites:					
Course requirements: seminar work / project Scale of assessment (preliminary/final): 100/0					
Learning outcomes: Students will be able to distinguish between different methods of education. They will have an overview of the principles and principles of each method and will be able to apply these principles in practice.					
Class syllabus: Flipped Classroom, Cooperative teaching, Brain-compatible teaching, method "Break", Realistic teaching (RME), Guided active learning, Jigsaw method, problem solving, rpg, simulation.					
Recommended literature:					
Languages necessary to complete the course: slovak, english					
Notes:					
Past grade distribution Total number of evaluated students: 28					
A	B	C	D	E	FX
96,43	0,0	0,0	3,57	0,0	0,0
Lecturers: RNDr. Monika Dillingerová, PhD.					
Last change: 17.03.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFI.KAI/2-MXX-132/23		Course title: Participation in Empirical Research			
Educational activities: Type of activities: course Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 2., 8.					
Educational level: I., I.II., 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: 202					
A	B	C	D	E	FX
89,6	1,49	1,49	0,0	2,97	4,46
Lecturers: Mgr. Xenia Daniela Poslon, PhD.					
Last change: 06.09.2023					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFI.KAI/2-MXX-132/23		Course title: Participation in Empirical Research			
Educational activities: Type of activities: course Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 1., 7.					
Educational level: I., I.II., 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: 202					
A	B	C	D	E	FX
89,6	1,49	1,49	0,0	2,97	4,46
Lecturers: Mgr. Xenia Daniela Poslon, PhD.					
Last change: 06.09.2023					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KDMFI/2-UXX-121/22	Course title: Pedagogic Diagnostics
Educational activities: Type of activities: lecture Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning	
Number of credits: 2	
Recommended semester: 2.	
Educational level: II.	
Prerequisites:	
Antirequisites: FMFI-Prif.KDPP/2-UXX-121/15	
Course requirements: The condition for successful completion of the course is to obtain at least 60% of the maximum possible evaluation of the course = active participation in classes (30%), homework (20%), reading literature (20%) The course is completed by an exam (30%). The rating is given on a scale: A (100-91%, excellent - excellent results), B (90-81%, very good - above average standard), C (80-73%, good - normal reliable work), D (72-66%, satisfactory - acceptable results), E (65-60%, sufficient - results meet minimum criteria), Fx (59-0%, insufficient - additional work required) Scale of assessment (preliminary/final): 70/30	
Learning outcomes: Students will acquire key knowledge about the standard form of diagnostics, its basic stages and the formulation of diagnostic conclusions. They will acquire the necessary competencies in the use of diagnostic procedures and techniques for determining and evaluating students' performance in school conditions and in the reflection and evaluation of their own activities and professional growth.	
Class syllabus: Diagnosis as standard, resp. intuitive process of detailed cognition and evaluation of the pupil's personality, pupil groups, resp. family environment. Diagnosis as a "court" about a student (student groups), various types of diagnoses, including case studies. Diagnostic procedures and techniques (product analysis of pupils' activities, performance tests, design techniques and traditional testing methods. The essence of school evaluation and its types. Evaluation of pupils' results, effects and school conditions. Action research as a specific professional activity of a teacher. Observation method. Interview method. Sociometers, self-diagnostics of pupils and teachers (self-evaluation,	

burnout diagnostics, diaries, questionnaires ...), diagnostics of classroom relationships, diagnosis of bullying.

Recommended literature:

FONTANA, D. 2014. Psychology in school practice. Prague: Portal 2014. 384 p. ISBN 978-80-262-0741-2

GAVORA, P. 2010. What are my students like? Nitra: Enigma, 2010. 224 p. ISBN 978-80-89132-91-1

JEDLIČKA, R. 2018. Pedagogical - psychological diagnostics (Chapter 7). In JEDLIČKA, R. et al. Educational psychology for teachers. Prague: Grada, 2018. p. 349-358. ISBN 978-80-271-0586-1

DYTRTOVÁ, R. - KRHUTOVÁ, M. 2009. Teacher: příprava na profesi. Publisher information: Praha: Grada, 128 s. ISBN 978-80-247-2863-6

HRABAL, V. st. - HRABAL, V. Jr. 2004. Diagnostics: Pedagogical-psychological diagnostics of a pupil with an introduction to diagnostic application. Prague: Karolinum. 268 s. ISBN 80-246-0319-3

HELUS, Z. 2007. Social psychology for pedagogues. Prague: Grada, 2007. 280 p. ISBN 978-80-247-1168-3

KOMPOLT, P. - TIMKOVÁ, B. : Pedagogical diagnostics and action research. Bratislava: UK, 2010. ISBN 978-80-223-2787-9

MIKULAJOVÁ, M. et al. 2012. Reading, writing and dyslexia. Bratislava: Slovak Association of Speech Therapy. 296 s. ISBN 978-80-89113-94-1

POKORNÁ, V. 2010. Theory and correction of learning and behavioral disorders. Prague: Portal. 336 s. ISBN 978-80-7376-817-3

MERTIN, V., KREJČOVÁ, L. : Methods and Procedures of Pupil Cognition. Pedagogical diagnostics. Wolters Kluwer CR, 2016;

GINNIS, P. : Effective Teaching Tools for Teachers. Universum Publishing House, 2019;

FLETCHER-WOOD, H. : Responsive Teaching. Cognitive sciences and formative assessment in practice. Universum, 2021.

Languages necessary to complete the course:

Slovak, Czech

Notes:

Past grade distribution

Total number of evaluated students: 96

A	B	C	D	E	FX
62,5	11,46	9,38	5,21	9,38	2,08

Lecturers: Mgr. Lucia Budinská, PhD., PaedDr. Mgr. Natália Kováčová, PhD., doc. Mgr. Karolína Miková, PhD.

Last change: 22.06.2022

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFLKDMFI/2-UXX-201/22	Course title: Philosophical Aspects of Education
Educational activities: Type of activities: lecture Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning	
Number of credits: 2	
Recommended semester: 3.	
Educational level: II.	
Prerequisites:	
Course requirements: During the teaching period of the semester: participation, activity, elaboration of assignments or final test. The test or assignments will be from the material covered during the semester. The student can get a maximum of 50 points, the minimum for successful completion of the course is 30 points. Classification scale: A: 100-92%, B: 91-84%; C: 83-76%, D: 75-68%, E: 67-60% FX: 0-59% Violation of academic ethics results in the cancellation of the obtained points in the relevant evaluation item. The teacher accepts max. 2 absences with proven documents. Interim / final evaluation weight: 100% in the examination period	
Learning outcomes: Upon successful completion of the course, students will know: A: in the field of knowledge: <ul style="list-style-type: none"> • What is philosophy, its basic structure, goals and mission • What issues do philosophy of education and philosophical anthropology address, what are their goals and mission? • What is the significance of philosophy for solving problems of theory and practice of education B: in the field of skills: <ul style="list-style-type: none"> • Orientation in basic philosophical problems, disciplines and concepts • Ask questions and formulate answers regarding philosophical questions of education • Think independently about philosophical issues of education 	
Class syllabus: <ol style="list-style-type: none"> 1. The concept and structure of philosophy 2. Philosophical and pedagogical anthropology 3. Philosophical anthropology and axiology 4. Philosophy of education I. 5. Philosophy of education II. 6. Philosophy of culture and values 7. Ethical issues and perspectives of education 	
Recommended literature:	

ANZENBACHER, Arno: Introduction to Philosophy. Prague: SPN, 1991. ISBN: 80-04-26038-1.
 BREZINKA, Wolfgang: Filozofické základy výchovy. Prague: Zvon, 1996. ISBN: 80-7113-169-5
 CORETH, Emerich: What is a human being? Fundamentals of philosophical anthropology. Prague: Zvon, 1994. ISBN: 80-7113-098-2
 POPKIN, Richard. H., STROLL, Avrum: Philosophy for Everyone. Prague: Ivo Zelezny, 2000. ISBN: 80-240-0257-4
 PELCOVÁ, Naděžda: Philosophical and pedagogical anthropology. Prague: Karolinum, 2000. ISBN: 80-246-0076-5
 Complementary literature and literature that is not in AK UK will be presented at the beginning and during the semester. Teachers' presentations and non-AK UK literature are available at MS Teams.

Languages necessary to complete the course:

Slovak

Notes:

Past grade distribution

Total number of evaluated students: 58

A	B	C	D	E	FX
70,69	18,97	8,62	0,0	1,72	0,0

Lecturers: Mgr. Štefan Zolcer, PhD.

Last change: 22.06.2022

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFLKTV/2-MXX-110/00		Course title: Physical Education and Sport (1)			
Educational activities: Type of activities: practicals Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 1., 7.					
Educational level: I.II., II.					
Prerequisites:					
Course requirements: Scale of assessment (preliminary/final): 100/0					
Learning outcomes:					
Class syllabus: Practicing of the students' game skills in collective sports: basketball, volleyball, football, floorball and hockey. Mastering of the basic technique of a particular sport discipline in other sports. In paddling, basic training on still and slightly flowing water. Development of coordination skills, improvement of articular mobility and cardiovascular system.					
Recommended literature:					
Languages necessary to complete the course: Slovak, English					
Notes:					
Past grade distribution Total number of evaluated students: 2007					
A	B	C	D	E	FX
97,41	0,6	0,1	0,0	0,0	1,89
Lecturers: PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, Mgr. Jana Leginusová, Mgr. Tomáš Kuchár, PhD., PaedDr. Mikuláš Ortutay, Mgr. Martin Dovičák, PhD., Mgr. Júlia Raábová, PhD., Mgr. Branislav Nedbálek, PhD., Mgr. Tomáš Lovecký, Mgr. Martina Mahel'ová, PaedDr. Lucia Ondrušová					
Last change: 15.03.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KTV/2-MXX-120/00		Course title: Physical Education and Sport (2)			
Educational activities: Type of activities: practicals Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 2., 8.					
Educational level: I.II., II.					
Prerequisites:					
Course requirements: Scale of assessment (preliminary/final): 100/0					
Learning outcomes:					
Class syllabus: Practicing of offensive and defensive game combinations and playing with modified rules in collective sports such as basketball, volleyball, football, floorball, hockey. Command of elements of higher difficulty in locomotion skills (swimming - crawl stroke, breast stroke, butterfly stroke, trampoline jumping and aerobics – practicing of areobics compositions, bodybuilding – development of the main muscle groups, paddling on running water. Testing of the level of physical fitness and coordination skills.					
Recommended literature:					
Languages necessary to complete the course: Slovak, English					
Notes:					
Past grade distribution Total number of evaluated students: 1797					
A	B	C	D	E	FX
98,44	0,33	0,06	0,06	0,06	1,06
Lecturers: Mgr. Martin Dovičák, PhD., Mgr. Tomáš Kuchár, PhD., Mgr. Jana Leginusová, PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, Mgr. Branislav Nedbálek, PhD., PaedDr. Mikuláš Ortutay, Mgr. Júlia Raábová, PhD., Mgr. Tomáš Lovecký, Mgr. Martina Mahel'ová, PaedDr. Lucia Ondrušová					
Last change: 15.03.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KTV/2-MXX-210/00		Course title: Physical Education and Sport (3)			
Educational activities: Type of activities: practicals Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 3., 9.					
Educational level: I.II., II.					
Prerequisites:					
Course requirements: Scale of assessment (preliminary/final): 100/0					
Learning outcomes:					
Class syllabus: To improve offensive and defensive game combinations in collective sports. Practicing of tactical and technical elements in individual sports. Compensatory exercises to correct wrong body posture. Stretching. Competition rules in sport disciplines.					
Recommended literature:					
Languages necessary to complete the course: Slovak, English					
Notes:					
Past grade distribution Total number of evaluated students: 1525					
A	B	C	D	E	FX
98,36	0,39	0,07	0,0	0,07	1,11
Lecturers: PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, Mgr. Jana Leginusová, Mgr. Tomáš Kuchár, PhD., PaedDr. Mikuláš Ortutay, Mgr. Martin Dovičák, PhD., Mgr. Júlia Raábová, PhD., Mgr. Branislav Nedbálek, PhD., Mgr. Tomáš Lovecký, Mgr. Martina Maheľová, PaedDr. Lucia Ondrušová					
Last change: 15.03.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KTV/2-MXX-220/00		Course title: Physical Education and Sport (4)			
Educational activities: Type of activities: practicals Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 4., 10.					
Educational level: I.II., II.					
Prerequisites:					
Course requirements: Scale of assessment (preliminary/final): 100/0					
Learning outcomes:					
Class syllabus: Sport training for Faculty Championships in a selected sport with modified rules. Selection of sport-talented students into teams of the Faculty Sport League, University League of Bratislava Faculties, and participation in sport events of the Faculty and University.					
Recommended literature:					
Languages necessary to complete the course: Slovak, English					
Notes:					
Past grade distribution Total number of evaluated students: 1267					
A	B	C	D	E	FX
98,34	0,39	0,08	0,08	0,08	1,03
Lecturers: PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, Mgr. Jana Leginusová, Mgr. Tomáš Kuchár, PhD., PaedDr. Mikuláš Ortutay, Mgr. Martin Dovičák, PhD., Mgr. Branislav Nedbálek, PhD., Mgr. Júlia Raábová, PhD., Mgr. Tomáš Lovecký, Mgr. Martina Maheľová, PaedDr. Lucia Ondrušová					
Last change: 15.03.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFLKDMFI/2-UFY-235/22	Course title: Physics Around Us
Educational activities: Type of activities: seminar Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning	
Number of credits: 2	
Recommended semester: 4.	
Educational level: II.	
Prerequisites:	
Antirequisites: FMFLKDMFI/1-UFY-335/15	
Course requirements: Continuous assessment: Active participation and communication of students in solving assigned tasks and discussion is expected. During the semester, each student will present a separate paper on the topic chosen by him. In addition, he prepares his own photo or video of a physical phenomenon from everyday life. Outputs are evaluated. The correctness of physics and the didactic quality of the output is evaluated. Indicative evaluation scale, the following mark must be achieved at least: A 90%, B 80%, C 70%, D 60%, E 50%. Credits will not be awarded if the student scores less than 50%.	
Learning outcomes: Graduates will have developed skills to apply the knowledge gained in physics, didactics and pedagogy to formulate and solve physical problems from home, leisure activities and similar areas of everyday life.	
Class syllabus: The seminar is designed as a collection of relatively separate case studies analyzing situations or objects from everyday life, analyzing the physical laws operating in given situations with an emphasis not only on qualitative but especially quantitative characterization of relevant phenomena. The emphasis is on order estimates and calculations. Some typical case studies: Scaling - volume and content ratios, physics around a washing machine, physics of energy transport, vehicle cornering, music and physics, computational physics, planets and stars.	
Recommended literature:	
Languages necessary to complete the course: Slovak and 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: PaedDr. Peter Horváth, PhD.					
Last change: 18.06.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KDMFI/2-UFY-238/22		Course title: Physics Aspects of Living Systems			
Educational activities: Type of activities: course Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 1.					
Educational level: II.					
Prerequisites:					
Course requirements: Students will write a written semester work during the semester. Project of the work (10 marks), preliminary work (20 marks), final version (20 marks), defence (20 marks), peer-assessment of the work of colleagues (30 marks). A = (90, 100]%, B = (80, 90]%, C = (70, 80]%, D: (60, 70]%, E: (50, 60]%) Credits will not be awarded if a student scores less than 50%.					
Learning outcomes: After completing the course, the student will be able to use physics knowledge in the context of living systems. Will understand the selected physics properties of cells, biological tissues, organs and organisms.					
Class syllabus: Physics properties of the cell membrane and transport processes. Physics basis of sensory perception, receptors. Physical principles of respiration. Physical principles applied in blood circulation. Electrical properties of tissues and organs. Own and mediated physical signals of tissues and organs, their recording. Interaction of ionizing radiation with matter. Imaging methods.					
Recommended literature:					
Languages necessary to complete the course: Slovak and English.					
Notes:					
Past grade distribution Total number of evaluated students: 35					
A	B	C	D	E	FX
45,71	34,29	14,29	5,71	0,0	0,0
Lecturers: doc. PaedDr. Viera Haverlíková, PhD.					
Last change: 18.06.2022					

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof.
RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KDMFI/2-UMA-253/22	Course title: Problematic Parts of Secondary School Mathematics
Educational activities: Type of activities: seminar Number of hours: per week: 3 per level/semester: 39 Form of the course: on-site learning	
Number of credits: 2	
Recommended semester: 3.	
Educational level: II.	
Prerequisites:	
Antirequisites: FMFI.KDMFI/2-UMA-253/19	
Course requirements: Continuous assessment: output in front of the board, seminar work Indicative assessment scale: A 94%, B 86%, C 79%, D 70%, E 60%, Fx <60% Scale of assessment (preliminary/final): 100/0	
Learning outcomes:	
Class syllabus: The course will follow on from the compulsory course Didactics of Mathematics 2 and will deal in depth with specific adequate methods, forms and age-appropriate activities for teaching problematic units in mathematics at lower secondary school.	
Recommended literature: Dostupné učebnice Matematiky pre 5. – 9. ročník ZŠ a nižšie ročníky osemročných gymnázií / Ján Žabka, Pavol Černek / Ondrej Šedivý a kol. / Soňa Čerťková a kol. / Milan Hejný a kol. Nový Pomocník z matematiky (5. – 9. ročník) / Iveta Kohanová a kol. Dítě, škola a matematika: Konstruktivistické přístupy k vyučování / Milan Hejný, František Kuřina. Praha : Portál, 2001 Matematické čítanie / Jo Boalerová. Bratislava : Tatran, 2016 Moderní vyučování / Geoffrey Petty. Praha : Portál, 1993 Dvacet pět kapitol z didaktiky matematiky / Milan Hejný, Jarmila Novotná, Nad'ea Stehlíková (Eds.) Praha, 2004 Own electronic materials published via the subject's website (eg course in LMS Moodle)	
Languages necessary to complete the course: slovak, english	
Notes:	

Past grade distribution					
Total number of evaluated students: 32					
A	B	C	D	E	FX
93,75	0,0	0,0	0,0	0,0	6,25
Lecturers: doc. PaedDr. Peter Vankúš, PhD., Mgr. Jana Havlíčková, PhD.					
Last change: 14.03.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KJP/1-MXX-161/00		Course title: Russian Language (1)			
Educational activities: Type of activities: practicals Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 1., 7.					
Educational level: I., I.II., II.					
Prerequisites:					
Course requirements: Scale of assessment (preliminary/final): 100/0					
Learning outcomes: Basic communication in Russian, developing other Russian language skills - listening comprehension, reading and writing.					
Class syllabus: To master the fundamentals of general Russian. The language level is A1. Learning the Cyrillic (Russian) alphabet, gaining basic language competence, building up skills and confidence in dealing with unfamiliar authentic and semi-authentic texts. The subject provides a course in Russian language for beginners.					
Recommended literature: The textbook: : Точка Ру А1 (Ольга Долматова, Екатерина Новачац), pracovné karty Падежи 1 (Л.С. Безкоровайная, В.Е. Штыленко).					
Languages necessary to complete the course:					
Notes:					
Past grade distribution Total number of evaluated students: 746					
A	B	C	D	E	FX
57,77	16,62	11,13	4,16	1,74	8,58
Lecturers: Viktoria Mirsalova					
Last change: 20.06.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KJP/1-MXX-162/00		Course title: Russian Language (2)			
Educational activities: Type of activities: practicals Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 2., 8.					
Educational level: I., I.II., II.					
Prerequisites:					
Course requirements: Scale of assessment (preliminary/final): 100/0					
Learning outcomes: Basic communication in Russian, developing other Russian language skills - listening comprehension, reading and writing.					
Class syllabus: To master the fundamentals of general Russian. Learning the Cyrillic (Russian) alphabet, gaining basic language competence, building up skills and confidence in dealing with unfamiliar authentic and semi-authentic texts. The subject continues the program of Russian language (1) and provides a course of Russian for beginners.					
Recommended literature: Textbook: Точка Ру А1 (Ольга Долматова, Екатерина Новачац), pracovné karty Падежи 1 (Л.С. Безкорвайная, В.Е. Штыленко).					
Languages necessary to complete the course:					
Notes:					
Past grade distribution Total number of evaluated students: 435					
A	B	C	D	E	FX
63,91	16,09	8,97	3,91	0,92	6,21
Lecturers: Viktoria Mirsalova					
Last change: 20.06.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KJP/1-MXX-261/00		Course title: Russian Language (3)			
Educational activities: Type of activities: practicals Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 3., 9.					
Educational level: I., I.II., II.					
Prerequisites:					
Course requirements: Scale of assessment (preliminary/final): 100/0					
Learning outcomes: Basic communication in Russian, developing other Russian language skills - listening comprehension, reading and writing.					
Class syllabus: Learning the handwritten Russian (Russian Cursive Cyrillic), developing further language skills, gaining knowledge of Russian culture, history and way of life, pre-intermediate to intermediate grammar and vocabulary. The course "Russian for Intermediate Students" is a follow-up to "Russian for Beginners". The subject of the course is general Russian in the range appropriate to the given level.					
Recommended literature: Точка Ру А2 (Ольга Долматова, Екатерина Новачац) a Short Stories in Russian (Olly Richards, Alex Rowlings)					
Languages necessary to complete the course:					
Notes:					
Past grade distribution Total number of evaluated students: 215					
A	B	C	D	E	FX
68,84	17,67	9,3	2,33	0,0	1,86
Lecturers: Viktoria Mirsalova					
Last change: 20.06.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KJP/1-MXX-262/00		Course title: Russian Language (4)			
Educational activities: Type of activities: practicals Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 4., 10.					
Educational level: I., I.II., II.					
Prerequisites:					
Course requirements: Scale of assessment (preliminary/final): 100/0					
Learning outcomes: Learning the handwritten Russian (Russian Cursive Cyrillic), developing further language skills, gaining knowledge of Russian culture, history and way of life, pre-intermediate to intermediate grammar and vocabulary.					
Class syllabus: Learning the handwritten Russian (Russian Cursive Cyrillic), developing further language skills, gaining knowledge of Russian culture, history and way of life, pre-intermediate to intermediate grammar and vocabulary. The course "Russian for Intermediate Students" is a follow-up to "Russian for Beginners". The subject of the course is general Russian in the range appropriate to the given level.					
Recommended literature: Точка Ру А2 (Ольга Долматова, Екатерина Новачац) a Short Stories in Russian (Olly Richards, Alex Rowlings)					
Languages necessary to complete the course:					
Notes:					
Past grade distribution Total number of evaluated students: 153					
A	B	C	D	E	FX
74,51	14,38	7,19	2,61	0,65	0,65
Lecturers: Viktoria Mirsalova					
Last change: 20.06.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KDMFI/2-UFY-241/22		Course title: School Biology for Physics Teachers			
Educational activities: Type of activities: course Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 3.					
Educational level: II.					
Prerequisites:					
Course requirements: During the semester, there will be two written examinations, from which the student can obtain max. 2x 20 points. In the middle of the semester, the student submits a plan of semester work - max. 10 points. At the end of the semester, the student submits a semester work - max. 20 points. During the exam period, there will be a discussion, where the student can get max. 30 points. Credits will not be awarded if a student scores less than 50%. Indicative final mark: A 90%, B 80%, C 70%, D 60%, E 50%					
Learning outcomes: The student will have a deep knowledge of the boundaries between the subjects of physics, chemistry and biology, especially at the lower secondary school level.					
Class syllabus: Various approaches to science education in different education systems. The usual content of subjects science, biology, chemistry physics at the ISCED level 2. Empirical cognition and work with sources of information in science education at lower secondary school.					
Recommended literature:					
Languages necessary to complete the course: Slovak and 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. PaedDr. Viera Haverlíková, PhD.					
Last change: 18.06.2022					

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFLKDMFI/2-UXX-205/22		Course title: Selected Chapters of The Learning Sciences			
Educational activities: Type of activities: seminar Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 4.					
Educational level: II.					
Prerequisites:					
Course requirements: During the semester, the student, based on information from lectures, prepares a proposal for a semester work (10 points) in the required structure, defends it (10 points) and implements it (20 points). Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 100 / 0					
Learning outcomes: The student knows selected approaches to current principles and tenets of learning formulated on knowledge of neuroscience results. In accordance with these principles and tenets can design a series of teaching sequences in his approbation.					
Class syllabus: Selected approaches to cognitive psychology. The theory of the 5 pillars of the mind. Knowledge-in-Pieces Theory. Principles and tenets of learning. Applying the acquired knowledge in design a series of teaching sequences in approbation subject.					
Recommended literature: 5 pillars of Mind / T.Tokuhama-Espinosa The Learning Science / R.K.Sawyer Course materials					
Languages necessary to complete the course: Slovak in combination with English (study literature also in English).					
Notes:					
Past grade distribution Total number of evaluated students: 13					
A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0
Lecturers: doc. RNDr. Peter Demkanin, PhD.					

Last change: 22.06.2022

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFI.KAG/2-UMA-115/23		Course title: Selected Parts of Algebra and Theoretical Arithmetic (1)			
Educational activities: Type of activities: course Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 3					
Recommended semester: 1.					
Educational level: II.					
Prerequisites:					
Antirequisites: FMFI.KAG/2-UMA-115/22					
Course requirements: Homework assignments Grading: A 90%, B 80%, C 70%, D 60%, E 50%, Fx < 50 % Scale of assessment (preliminary/final): Semester 100% (homework assignments)					
Learning outcomes: Students will gain familiarity with axiomatic definitions and applications of some algebraic structures, such as groups and fields. They will be able to prove basic results about sets operations and to verify whether some commonly used sets are countable or uncountable.					
Class syllabus: Selected topics from the following areas: Introduction to set theory. Operation with sets, functions. Cardinality, inequality between cardinal numbers, operations with cardinal numbers and their properties. Cantor's theorem. Countable and uncountable sets, applications. Basics of group theory. Symmetry groups, permutation groups, abstract notion of a group. Subgroups, cyclic groups. Cosets and Langrange's theorem. Homomorphisms, normal subgroups, quotient groups. Rings and fields. Modular arithmetic, polynomial rings. Construction of \mathbb{Q} from \mathbb{Z} , \mathbb{C} from \mathbb{R} , $\mathbb{Q}(\sqrt{p})$ from \mathbb{Z} . Field extensions, finite fields, impossibility of some geometric constructions.					
Recommended literature:					
Languages necessary to complete the course:					
Notes:					
Past grade distribution Total number of evaluated students: 165					
A	B	C	D	E	FX
75,76	10,91	8,48	2,42	2,42	0,0

Lecturers: RNDr. Martin Sleziak, PhD., prof. RNDr. Pavol Zlatoš, PhD.

Last change: 29.05.2023

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFLKAG/2-UMA-116/24		Course title: Selected Parts of Algebra and Theoretical Arithmetic (2)			
Educational activities: Type of activities: course Number of hours: per week: 3 per level/semester: 39 Form of the course: on-site learning					
Number of credits: 3					
Recommended semester: 2.					
Educational level: II.					
Prerequisites:					
Course requirements: Homework assignments, final exam Grading: A 90%, B 80%, C 70%, D 60%, E 50%, Fx < 50 % Scale of assessment (preliminary/final): Semester 25% (homework assignments)/Final exam 75%					
Learning outcomes: Students will gain familiarity with examples of mathematical objects (symmetries, permutations, linear maps) which can be described by using an axiomatic approach. They will be able to use these definitions and deduce basic properties, analyze examples and identify various algebraic structures, such as groups and fields.					
Class syllabus: Selected topics from the following areas: Examples of permutation groups, braid groups, groups of symmetries and matrix groups. Description by generators, relations, consequences of non-commutativity. Abstract notion of a group. Subgroups, orders, cyclic groups. Cosets and Langrange's theorem. Homomorphisms, normal subgroups, quotient groups. Group actions, stabilizers, orbits. Symmetries of Platonic solids. Rings, fields and integral domains. Modular arithmetic, polynomial rings. Ideals, ring factorization, homomorphisms of rings. Field extensions. Rings with unique factorization, Gauss primes, etc.					
Recommended literature:					
Languages necessary to complete the course:					
Notes:					
Past grade distribution Total number of evaluated students: 104					
A	B	C	D	E	FX
64,42	14,42	13,46	3,85	3,85	0,0
Lecturers: Mgr. Martin Niepel, PhD., prof. RNDr. Pavol Zlatoš, PhD.					

Last change: 09.09.2024

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFLKAG/2-UMA-207/22	Course title: Selected Parts of Geometry (1)
Educational activities: Type of activities: course Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning	
Number of credits: 3	
Recommended semester: 1.	
Educational level: II.	
Prerequisites:	
Course requirements: Continuous assessment: homework (50%). Final assessment: written exam (50%). At least half of the points from the continuous assessment must be admitted to the exam. Grading: A [100-90], B (90-80], C (80-70], D (70-60], E (60-50], Fx (50-0]. Scale of assessment (preliminary/final): 50/50	
Learning outcomes: Course graduate: 1. Knows basic affine and metric properties of conic sections in the Euclidean plane and quadratic surfaces in the Euclidean three-dimensional space, using mainly the analytical method. 2. Is aware of the crucial role of polarity in the theory of quadratic forms. Is informed about quadrics in the Euclidean space of any dimension. 3. Is acquainted with synthetic constructions of real regular conic sections and practical applications and interpretations of their properties.	
Class syllabus: 1. Conics in the Euclidean plane: definition and representation; asymptotic vectors; regular, singular point; the center of the conic; polarity; tangents; principal vectors; axes and vertices of the conics; affine and metric classification of conics; focal points and directrices. Applications. 2. Fundamentals of the theory of quadratic surfaces in the Euclidean three-dimensional space: regular linear and non-linear quadratic surfaces; singular quadratic surfaces; quadratic surfaces such as cylindrical surfaces over the conic sections; quadratic surfaces obtained by affine transformation of a conic. Intersection points of a line (plane) with a quadratic surface.	
Recommended literature: Geometria 1 : Pre študentov matematiky učiteľského štúdia na univerzitách a pedagogických fakultách / Milan Hejný, Valent Zaťko, Pavel Kršňák. Bratislava : Slovenské pedagogické nakladateľstvo, 1985 Analytická teória kuželosečiek a kvadrik / Josef Janyška, Anna Sekaninová. Brno : Masarykova univerzita, 2001	

Analytická geometria kužeľosečiek / Leo Boček. Bratislava : Slovenské pedagogické nakladateľstvo, 1978					
Languages necessary to complete the course: Slovak, English					
Notes:					
Past grade distribution Total number of evaluated students: 169					
A	B	C	D	E	FX
23,08	18,34	28,99	13,61	8,28	7,69
Lecturers: Mgr. Marcel Makovník, PhD., doc. RNDr. Pavel Chalmovianský, PhD.					
Last change: 04.07.2023					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFLKAG/2-UMA-208/24		Course title: Selected Parts of Geometry (2)			
Educational activities: Type of activities: course Number of hours: per week: 3 per level/semester: 39 Form of the course: on-site learning					
Number of credits: 3					
Recommended semester: 2.					
Educational level: II.					
Prerequisites:					
Course requirements: The student can get 100% for written homeworks. Grading: A (100-91), B (90-81), C (80-71), D (70-61), E (60-51), Fx (50-0). Scale of assessment (preliminary/final): Preliminary assessment 100% for written homework assignments.					
Learning outcomes: By completing the course, the student will gain deeper knowledge about the properties of curves and surfaces. They will become familiar with their fundamental applications in practical disciplines such as modern design, engineering, construction, cartography, and art.					
Class syllabus: Gear wheels, milling, 3D printing, exceptional structures, maps, typography, painting, and sculpture from the perspective of objects, methods, and representations in differential geometry.					
Recommended literature: Helmut Pottmann, Andreas Asperl, Michael Hofer, Axel Kilian, Daril Bentley: Architectural Geometry, Bentley Institute Press, 2007 Lectures on classical differential geometry / Dirk J. Struik. Cambridge : Addison-Wesley Press, 1950 Elektronické učebné texty predmetu					
Languages necessary to complete the course: Slovak, English					
Notes:					
Past grade distribution Total number of evaluated students: 135					
A	B	C	D	E	FX
23,7	18,52	25,19	14,81	9,63	8,15
Lecturers: doc. RNDr. Pavel Chalmovianský, PhD.					

Last change: 09.09.2024

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFLKMANM/2- UMA-111/22		Course title: Selected Parts of Mathematical Analysis (1)			
Educational activities: Type of activities: course Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 3					
Recommended semester: 1.					
Educational level: II.					
Prerequisites:					
Course requirements: Continuous assessment: homework Final assessment: paper Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 40/60					
Learning outcomes: Students will master the basic analytical methods of investigation and modeling, when the action is affected by two variables. They will be able to estimate the shape of the graph of the functions of two variables.					
Class syllabus: Examples of quantities whose change depends on several variables. Graphs of some typical functions of two variables. Space \mathbb{R}^2 and \mathbb{R}^3 . Sequence convergence in \mathbb{R}^2 . Limit and continuity of a function of two variables. Partial derivation. Extremes of a function of two variables.					
Recommended literature: Diferenciální počet / Vojtech Jarník. Praha : Academia, 1984 Zbierka úloh z vyššej matematiky : 3.časť / Jozef Eliaš, Ján Horváth, Juraj Kajan. Bratislava : Slovenské vydavateľstvo technickej literatúry, 1967					
Languages necessary to complete the course:					
Notes:					
Past grade distribution Total number of evaluated students: 184					
A	B	C	D	E	FX
51,63	16,85	15,22	10,33	5,98	0,0
Lecturers: doc. RNDr. Zbyněk Kubáček, CSc., Mgr. Jana Havlíčková, PhD.					

Last change: 14.03.2022

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KMANM/2- UMA-112/24	Course title: Selected Parts of Mathematical Analysis (2)
Educational activities: Type of activities: course Number of hours: per week: 3 per level/semester: 39 Form of the course: on-site learning	
Number of credits: 3	
Recommended semester: 2.	
Educational level: II.	
Prerequisites:	
Antirequisites: FMFI.KMANM/2-UMA-112/15	
Course requirements: Continuous assessment: homework Final evaluation: test Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 40/60	
Learning outcomes: Students will expand their knowledge of the function of two variables. Using the double integral, they will be able to calculate different areas, volumes, lengths of curves.	
Class syllabus: Areas of type $[x, y]$ and $[y, x]$ and a formula for integrating the function of two variables in these areas. Calculation of areas, volumes and lengths of curves.	
Recommended literature: Integrální počet / Vojtech Jarník. Praha : Československá akademie věd, 1976 Zbierka úloh z vyššej matematiky : 4.časť / Jozef Eliaš, Ján Horváth, Juraj Kajan, Robert Šulka. Bratislava : Alfa, 1979 Matematika III, Zbierka riešených úloh z integrálneho počtu funkcie viac premenných a krivkových integrálov / Dillingerová M., Feťková J., Híc P., Tóthová M. Alfa : Bratislava 1990	
Languages necessary to complete the course: slovak, english	
Notes: For successful completion, it is desirable to first complete the course Selected Parts of Mathematical Analysis.	

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. Zbyněk Kubáček, CSc., Mgr. Jana Havlíčková, PhD.					
Last change: 09.09.2024					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KDMFI/2-UMA-283/22	Course title: Selected Topics in Teaching of Mathematics
Educational activities: Type of activities: seminar Number of hours: per week: 3 per level/semester: 39 Form of the course: on-site learning	
Number of credits: 2	
Recommended semester: 2.	
Educational level: II.	
Prerequisites:	
Course requirements: Continuous assessment: homework (30 points) Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 100/0	
Learning outcomes: After completing the course, the student knows the theories of various forms of teaching, some of which he has tried. He knows the root causes of the problems that students with a planar representation of space have - the question "Why don't students see it?". Can carry out various additional activities that develop students' mathematical competencies, e.g. competitions, games, fun afternoon.	
Class syllabus: Basic features and historical development of constructivist teaching. Piaget, Kohlberg, Vygotsky, Bachelard. Creation of teaching material. Group and cooperative teaching. Didactic game, its use and creation. Stereometry cubes with paper scissors and glue. Stereometry of a circle, folding "other" origami. Project teaching, project assignment (to whom, what, how, when, for what time). Problem teaching, design of own problem teaching. Outdoor school - from organization to implementation. Mathematical afternoon at school in nature, creation of a program "out". Mathematical competitions - various forms of competitions, difficulty assessment and task creation.	
Recommended literature: Teória vyučovania matematiky 2 / Milan Hejný ... [et al.]. Bratislava : Slovenské pedagogické nakladateľstvo, 1990 Učebné materiály pre vyučovanie matematiky / výber zostavili a preložili Monika Dillingerová, Lilla Koreňová, Peter Vankúš. Bratislava : Knižničné a edičné centrum FMFI UK, 2009 Geometrické úlohy z matematickej olympiády ZŠ / Monika Dillingerová. Bratislava : Metodicko-pedagogické centrum, 2005	
Languages necessary to complete the course: slovak, english	

Notes:					
Past grade distribution Total number of evaluated students: 128					
A	B	C	D	E	FX
60,16	21,88	7,81	3,91	3,13	3,13
Lecturers: doc. PaedDr. Peter Vankúš, PhD., RNDr. Monika Dillingerová, PhD.					
Last change: 15.06.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFLKTF/2-UFY-102/22		Course title: Selected chapters from Modern Physics			
Educational activities: Type of activities: lecture / practicals Number of hours: per week: 2 / 1 per level/semester: 26 / 13 Form of the course: on-site learning					
Number of credits: 3					
Recommended semester: 2.					
Educational level: II.					
Prerequisites:					
Course requirements: During the semester, there will be two written examinations, from which the student can obtain max. 2x 20 marks. In the middle of the semester, the student submits a plan of semester work - max. 10 marks. At the end of the semester, the student submits a semester work - max. 20 marks. In the exam period, there will be a structured discussion, where the student can get max. 30 marks. Credits will not be awarded if the student scores less than 50% of the marks.					
Learning outcomes: The graduate will have advanced knowledge in selected areas of modern physics with a focus on higher secondary and high school physics teachers.					
Class syllabus: Statistical physics, Thermodynamics, Perspectives of theoretical physics on light, electricity, electromagnetism, nuclear physics, quantum mechanics, particle physics and cosmology.					
Recommended literature:					
Languages necessary to complete the course: Slovak and English.					
Notes:					
Past grade distribution Total number of evaluated students: 76					
A	B	C	D	E	FX
53,95	25,0	11,84	1,32	7,89	0,0
Lecturers: doc. Mgr. Samuel Kováčik, PhD.					
Last change: 18.06.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFLKMANM+KAG/2- UMA-211/22	Course title: Seminar in History of Mathematics (1)
Educational activities: Type of activities: seminar Number of hours: per week: 3 per level/semester: 39 Form of the course: on-site learning	
Number of credits: 2	
Recommended semester: 3.	
Educational level: II., N	
Prerequisites:	
Course requirements: Ongoing evaluation: presentation of the prepared lesson (20 points), preparation of the written exam for other participants (10 points), active participation in the evaluation of presentations and written exams of other participants (30 points). Grading: A (56-60 points), B (51-55 points), C (46-50 points), D (41-45 points), E (36-40 points), Fx (0-35 points). Weight of the ongoing / final assessment: 100/0 Scale of assessment (preliminary/final): 100/0	
Learning outcomes: Student will gain an overview of the various periods of development of mathematics in antiquity, including examples of problems solved in individual basic works.	
Class syllabus: Mathematics of ancient Egypt and Babylonia. Pre-Euclidean mathematics in ancient Greece. Euclid's Elements.	
Recommended literature: Dějiny matematiky / Dirk J. Struik ; přeložili Jaroslav Folta, Luboš Nový. Praha : Orbis, 1963 Dějiny matematiky ve starověku / Arnošt Kolman. Praha : Academia, 1968 Dějiny matematiky ve středověku / Adolf P. Juškevič. Praha : Academia, 1977 Dejiny matematiky / Ján Čižmár. Bratislava : Perfekt, 2020 The history of mathematics / Roger L. Cooke. Hoboken, NJ : John Wiley, 2003 The history of mathematics / David M. Burton, New York : McGraw-Hill, 2011	
Languages necessary to complete the course: Slovak, English	
Notes:	

Past grade distribution					
Total number of evaluated students: 194					
A	B	C	D	E	FX
69,07	25,77	4,64	0,52	0,0	0,0
Lecturers: doc. RNDr. Zbyněk Kubáček, CSc., prof. RNDr. Pavol Zlatoš, PhD., RNDr. Kristína Rostás, PhD.					
Last change: 24.06.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFLKMANM/2- UMA-212/24	Course title: Seminar in History of Mathematics (2)
Educational activities: Type of activities: seminar Number of hours: per week: 3 per level/semester: 39 Form of the course: on-site learning	
Number of credits: 2	
Recommended semester: 4.	
Educational level: II., N	
Prerequisites:	
Course requirements: Ongoing evaluation: presentation of the prepared lesson (20 points), preparation of the written exam for other participants (10 points), active participation in the evaluation of presentations and written exams of other participants (30 points). Grading: A (56-60 points), B (51-55 points), C (46-50 points), D (41-45 points), E (36-40 points), Fx (0-35 points). Weight of the ongoing / final assessment: 100/0 Scale of assessment (preliminary/final): 100/0	
Learning outcomes: The student will gain an overview of the various periods of mathematics development, including examples of problems solved in individual basic works.	
Class syllabus: Students will choose from the following topics: Ptolemy. Apollonius. Chinese and Arabic mathematics. Fibonacci. Alcuin's problems. Cardano's Ars Magna. Pascal's Arithmetic Triangle. Huygens's De Ratiociniis in Ludo Aleae. Bernoulli's Ars Conjectandi. Cavalieri's Geometry of indivisibles. Euler's Introductio and Letters to a German Princess. Venn's Symbolic Logic.	
Recommended literature: Matematika v proměnách věků III / Editori Jindřich Bečvář, Eduard Fuchs. Praha : Výzkumné centrum pro dějiny vědy, 2004 Dějiny matematiky / Dirk J. Struik ; přeložili Jaroslav Folta, Luboš Nový. Praha : Orbis, 1963 Dějiny matematiky ve starověku / Arnošt Kolman. Praha : Academia, 1968 Dějiny matematiky ve středověku / Adolf P. Juškevič. Praha : Academia, 1977 Dějiny matematiky / Ján Čižmár. Bratislava : Perfekt, 2020 The history of mathematics / Roger L. Cooke. Hoboken, NJ : John Wiley, 2003 The history of mathematics / David M. Burton, New York : McGraw-Hill, 2011	
Languages necessary to complete the course: Slovak, English	

Notes:					
Past grade distribution Total number of evaluated students: 18					
A	B	C	D	E	FX
94,44	5,56	0,0	0,0	0,0	0,0
Lecturers: doc. RNDr. Zbyněk Kubáček, CSc.					
Last change: 31.05.2024					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027							
University: Comenius University Bratislava							
Faculty: Faculty of Mathematics, Physics and Informatics							
Course ID: FMFL.KJP/1-MXX-171/20				Course title: Slovak Language for Foreign Students (1)			
Educational activities: Type of activities: practicals Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning							
Number of credits: 2							
Recommended semester: 1., 7.							
Educational level: I., I.II., II., III.							
Prerequisites:							
Course requirements: tests Course prerequisites: https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/ Scale of assessment (preliminary/final): 100/0							
Learning outcomes: This course is aimed for foreign students to learn the fundamentals of the Slovak language with the focus on basic communication as well as all other language skills- listening comprehension, reading and writing.							
Class syllabus: The syllabus is targeted at the comprehension of the basics of the Slovak language for the absolute beginners (A1).							
Recommended literature: Krížom- Krážom Slovenčina 1, additional material to further support the covered topics.							
Languages necessary to complete the course:							
Notes:							
Past grade distribution Total number of evaluated students: 155							
A	ABS	B	C	D	E	FX	NEABS
40,65	21,29	7,1	4,52	0,65	1,29	21,29	3,23
Lecturers: Mgr. Aneta Barnes							
Last change: 21.06.2022							
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.							

COURSE DESCRIPTION

Academic year: 2026/2027							
University: Comenius University Bratislava							
Faculty: Faculty of Mathematics, Physics and Informatics							
Course ID: FMFL.KJP/1-MXX-172/20				Course title: Slovak Language for Foreign Students (2)			
Educational activities: Type of activities: practicals Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning							
Number of credits: 2							
Recommended semester: 2., 8.							
Educational level: I., I.II., II., III.							
Prerequisites:							
Course requirements: tests Course prerequisites: https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/ Scale of assessment (preliminary/final): 100/0							
Learning outcomes: This course is aimed for foreign students to learn the fundamentals of the Slovak language with the focus on basic communication as well as all other language skills- listening comprehension, reading and writing.							
Class syllabus: The syllabus is targeted at the comprehension of the basics of the Slovak language for the absolute beginners (A1) and this course is a follow up course to the Slovak language course 1.							
Recommended literature: Križom- Krážom Slovenčina 1, additional material to further support the covered topics							
Languages necessary to complete the course:							
Notes:							
Past grade distribution Total number of evaluated students: 87							
A	ABS	B	C	D	E	FX	NEABS
63,22	18,39	1,15	1,15	0,0	0,0	9,2	6,9
Lecturers: Mgr. Aneta Barnes							
Last change: 21.06.2022							
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.							

COURSE DESCRIPTION

Academic year: 2026/2027							
University: Comenius University Bratislava							
Faculty: Faculty of Mathematics, Physics and Informatics							
Course ID: FMFL.KJP/1-MXX-271/20				Course title: Slovak Language for Foreign Students (3)			
Educational activities: Type of activities: practicals Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning							
Number of credits: 2							
Recommended semester: 3., 9.							
Educational level: I., I.II., II., III.							
Prerequisites:							
Course requirements: tests Course prerequisites: https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/ Scale of assessment (preliminary/final): 100/0							
Learning outcomes: This course is aimed for foreign students to better comprehend all the language skills important to enable correct usage of the Slovak language – listening comprehension, reading, writing and speaking.							
Class syllabus: The syllabus is targeted at the comprehension of all the language skills of the Slovak language , and it is a follow up course to the Slovak language course 2.							
Recommended literature: Krížom-Krážom Slovenčina 2, additional material to further support the covered topics.							
Languages necessary to complete the course:							
Notes:							
Past grade distribution Total number of evaluated students: 32							
A	ABS	B	C	D	E	FX	NEABS
59,38	3,13	18,75	3,13	3,13	0,0	12,5	0,0
Lecturers: Mgr. Aneta Barnes							
Last change: 21.06.2022							
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.							

COURSE DESCRIPTION

Academic year: 2026/2027							
University: Comenius University Bratislava							
Faculty: Faculty of Mathematics, Physics and Informatics							
Course ID: FMFL.KJP/1-MXX-272/20				Course title: Slovak Language for Foreign Students (4)			
Educational activities: Type of activities: practicals Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning							
Number of credits: 2							
Recommended semester: 4., 10.							
Educational level: I., I.II., II., III.							
Prerequisites:							
Course requirements: tests Course prerequisites: https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/ Scale of assessment (preliminary/final): 100/0							
Learning outcomes: This course is aimed for foreign students to better comprehend all the language skills important to enable correct usage of the Slovak language – listening comprehension, reading, writing and speaking.							
Class syllabus: The syllabus is targeted at the comprehension of all the language skills of the Slovak language , and it is a follow up course to the Slovak language course 3.							
Recommended literature: Križom-Krážom Slovenčina 2, additional material to further support the covered topics.							
Languages necessary to complete the course:							
Notes:							
Past grade distribution Total number of evaluated students: 25							
A	ABS	B	C	D	E	FX	NEABS
84,0	0,0	4,0	4,0	0,0	0,0	8,0	0,0
Lecturers: Mgr. Aneta Barnes							
Last change: 21.06.2022							
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.							

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFLKTV/2-MXX-115/17		Course title: Sports in Natur (1)			
Educational activities: Type of activities: Number of hours: per week: per level/semester: Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 1., 7.					
Educational level: I.II., II.					
Prerequisites:					
Course requirements: Grades: A 90%, B 80%, C 70%, D 60%, E 50% The condition for the award of 1 or 2 credits is the completion of a multi-day course in its full scope, or the completion of one-day courses in the scope of 4 days. Candidates can apply to the leaders of individual courses. From the presented offer of courses, you can choose the one that suits your interests, abilities and deadlines.					
Learning outcomes: Acquisition and development of basic motor skills and abilities in selected sports: skiing and snowboarding. Mastering the correct technique of performing individual movements, which are necessary for skiing and snowboarding.					
Class syllabus: The student can sign up for the outdoor sports courses offered by the department: skiing, snowboarding. The lessons in the courses are focused on the development of basic and special movement skills and mastering the techniques needed for the sports.					
Recommended literature:					
Languages necessary to complete the course: Slovak					
Notes: KTVŠ does not rent ski equipment.					
Past grade distribution Total number of evaluated students: 186					
A	B	C	D	E	FX
98,92	0,0	0,0	0,0	0,0	1,08
Lecturers: Mgr. Martin Dovičák, PhD., Mgr. Tomáš Kuchár, PhD., Mgr. Jana Leginusová, PaedDr. Dana Mašlejová, Mgr. Ladislav Mokus, PaedDr. Mikuláš Ortutay, Mgr. Júlia Raábová, PhD., Mgr. Tomáš Lovecký					

Last change: 16.06.2022

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFLKTV/2-MXX-116/18		Course title: Sports in Natur (2)			
Educational activities: Type of activities: Number of hours: per week: per level/semester: Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 2., 8.					
Educational level: I.II., II.					
Prerequisites:					
Course requirements: Grades: A 90%, B 80%, C 70%, D 60%, E 50%. The condition for the award of 1 or 2 credits is the completion of a multi-day course in its full scope, or the completion of one-day courses in the scope of 4 days. Candidates can apply to the leaders of individual courses. From the presented offer of courses, you can choose the one that suits your interests, abilities and deadlines.					
Learning outcomes: Creating a positive and lasting relationship with physical activity. Acquisition and mastery of basic motor skills and abilities in outdoor sports: windsurfing, beach volleyball, water tourism - river rafting, hiking and other sports according to interest. Training and improving the technique needed for the sports.					
Class syllabus: The student can sign up for the outdoor sports courses offered by the department: water tourism - river rafting, windsurfing, beach volleyball, hiking and other hobby sports. The lessons in the courses are focused on the development of basic and special movement skills and, mastering the techniques needed for the sports.					
Recommended literature:					
Languages necessary to complete the course: Slovak					
Notes: KTVŠ will provide sports equipment.					
Past grade distribution Total number of evaluated students: 109					
A	B	C	D	E	FX
95,41	0,0	0,0	0,0	0,0	4,59

Lecturers: Mgr. Martin Dovičák, PhD., Mgr. Tomáš Kuchár, PhD., Mgr. Jana Leginusová, PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, PaedDr. Mikuláš Ortutay, Mgr. Júlia Raábová, PhD., Mgr. Tomáš Lovecký

Last change: 16.06.2022

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFLKDMFI/2-UXX-204/22	Course title: Starting Teacher at School
Educational activities: Type of activities: seminar Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning	
Number of credits: 2	
Recommended semester: 4.	
Educational level: II.	
Prerequisites:	
Course requirements: Continuous assessment: active participation in seminars + preparation for classes (80%), project / report (20%) A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 100 / 0	
Learning outcomes: The student: <ul style="list-style-type: none"> - gets a concrete idea of the teacher's responsibilities - will be acquainted with the recommended procedures and effective ways of solving various situations in pedagogical practice - propose activities and be able to assess their suitability for application to different problems with different groups of students - can plan their own personal development in addition to professional development and take a critical approach to self-reflection 	
Class syllabus: <ul style="list-style-type: none"> - first year of the teacher (holidays, payslips, attendance, introductory teacher, training, ...) - work of subject commissions and pedagogical documentation - class - coordination of school activities and events - communication with parents - crisis situations at school - professional development and mental health care - toxic stress and inappropriate behavior - bullying at school, mobing and bossing - working with students with special educational needs 	
Recommended literature: own electronic texts published on the website, resp. in the Moodle environment GINNIS, P .: Effective Teaching Tools for Teachers. Universum Publishing House, 2019.	

GORDON, T. : School without Losers. Malvern. 2015.
 BREAUX, A. : Quick help for teachers. Portal. 2020.
 SMETÁČKOVÁ, I., ŠTECH, S. : Učitelské vyhoření. Portal. 2020.
 ČAPEK, R. : Lazy Teacher. How to teach well and effectively. Raabe. 2019
 BUCHWALD, P. : Stress at school and how to manage it. Edika. 2013.
 JANÍK, T. : Myths of False Error. About chibas in education and pedagogy. Masaryk University. 2020.
 ČOKYNA, J. : And where are your edges? N Press. 2019

Languages necessary to complete the course:

Slovak, English

Notes:

Past grade distribution

Total number of evaluated students: 10

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

Lecturers: Mgr. Lucia Budinská, PhD., doc. Mgr. Karolína Miková, PhD., Mgr. Jakub Krcho

Last change: 22.06.2022

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFLKDMFI/2-UMA-120/23		Course title: Students' Research Exhibition (1)			
Educational activities: Type of activities: training session Number of hours: per week: per level/semester: 3d Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 2.					
Educational level: 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: 1					
A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0
Lecturers: doc. PaedDr. Mária Slavičková, PhD.					
Last change: 15.01.2024					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFLKDMFI/2-UMA-220/23		Course title: Students' Research Exhibition (2)			
Educational activities: Type of activities: training session Number of hours: per week: per level/semester: 3d Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 4.					
Educational level: 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: 4					
A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0
Lecturers: doc. PaedDr. Mária Slavičková, PhD.					
Last change: 15.01.2024					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KDMFI/2-UFY-245/22		Course title: Symbols and Patterns in Physics Education			
Educational activities: Type of activities: course Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 4.					
Educational level: II.					
Prerequisites:					
Course requirements: During the semester there will be two tests from which the student can obtain max. 2x 10 points. In the middle of the semester, the student submits a plan of semester work - max. 10 points. At the end of the semester the student defends the semester work - max. 20 points. Credits will not be awarded if the student scores less than 50% of marks. Rating scale: over 90% A; 80% -90% B; 70% -80% C; 60% -70% D; 50% -60% E.					
Learning outcomes: Students are familiar with current approaches to symbols, patterns, order, categories, and relationships in the context of human thinking. They know how to identify them in different topics, contexts and approaches to physical and science education.					
Class syllabus: Symbols. Patterns. Order. Categories. Relationships. Identification of ways of thinking in topics, contexts of physics and science education.					
Recommended literature:					
Languages necessary to complete the course: Slovak and 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 Demkanin, PhD.					
Last change: 18.06.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFL.KDMFI/2-UXX-203/22	Course title: Teacher Communication Skills
Educational activities: Type of activities: seminar Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning	
Number of credits: 2	
Recommended semester: 3.	
Educational level: II.	
Prerequisites:	
Course requirements: Continuous assessment: active work in class (interactive presentation and practical solution of tasks - 50% of continuous assessment), submission and presentation of assignments (preparation for class and completion of lessons - 50% of continuous assessment). Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 100 / 0	
Learning outcomes: The student will be at the end of the semester: <ul style="list-style-type: none"> - know specific activities focused on psychosocial interaction - have experienced and practiced application of selected communication skills - familiar with the rules and implications of best practices for effective communication - know the rules and structure of arguments - be able to appropriately apply the knowledge of solo taxonomy in evaluating the quality of verbal statements of the student 	
Class syllabus: <ul style="list-style-type: none"> - Key competencies of the teacher, influential theories about concepts in communication - Verbal and nonverbal communication in the classroom - Evaluation of verbal outcomes - SOLO taxonomy - Argumentation as a part of critical thinking, conceptual comics - Teacher questions - Feedback - Pupils' participation in learning communication - Dialogue teaching - Use of psychosocial interaction training in school practice - Silent video as a means of developing communication skills 	
Recommended literature: šedřová, K. et al. .: Výukova komunikace, Masarykova Univerzita, Brno 2019.	

Svoboda, M .: Psychosocial interaction training in pedagogical practice, University of West Bohemia in Pilsen, 2017.

Languages necessary to complete the course:

Slovak

Notes:

Past grade distribution

Total number of evaluated students: 32

A	B	C	D	E	FX
62,5	9,38	6,25	9,38	9,38	3,13

Lecturers: doc. Mgr. Karolína Miková, PhD., doc. PaedDr. Klára Velmovská, PhD., Mgr. Mária Božová

Last change: 22.06.2022

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFLKDMFI+KAG/2- UXX-851/22		Course title: Teaching Practice A (2)			
Educational activities: Type of activities: practice Number of hours: per week: per level/semester: 10d Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 2.					
Educational level: 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: 47					
A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0
Lecturers: PaedDr. Peter Horváth, PhD., RNDr. Michal Winczer, PhD., Mgr. Michaela Vargová, PhD., RNDr. Jana Chalmovianská, PhD., PaedDr. Mgr. Natália Kováčová, PhD.					
Last change: 22.08.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFLKDMFI+KAG/2- UXX-853/22		Course title: Teaching Practice A (3)			
Educational activities: Type of activities: practice Number of hours: per week: per level/semester: 15d Form of the course: on-site learning					
Number of credits: 3					
Recommended semester: 3.					
Educational level: 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: 62					
A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0
Lecturers: RNDr. Michal Winczer, PhD., Mgr. Michaela Vargová, PhD., PaedDr. Peter Horváth, PhD., RNDr. Jana Chalmovianská, PhD., PaedDr. Mgr. Natália Kováčová, PhD.					
Last change: 22.08.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027						
University: Comenius University Bratislava						
Faculty: Faculty of Mathematics, Physics and Informatics						
Course ID: FMFL.KDMFI+KAG/2- UXX-854/22			Course title: Teaching Practice A (3)			
Educational activities: Type of activities: practice Number of hours: per week: per level/semester: 15d Form of the course: on-site learning						
Number of credits: 3						
Recommended semester: 3.						
Educational level: 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: 72						
A	ABS	B	C	D	E	FX
97,22	0,0	2,78	0,0	0,0	0,0	0,0
Lecturers: RNDr. Michal Winczer, PhD., PaedDr. Peter Horváth, PhD., Mgr. Michaela Vargová, PhD., RNDr. Jana Chalmovianská, PhD., M. A. Linda Steyne, PhD., PaedDr. Mgr. Natália Kováčová, PhD., doc. PaedDr. Janka Peráčková, PhD.						
Last change: 22.08.2022						
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.						

COURSE DESCRIPTION

Academic year: 2026/2027						
University: Comenius University Bratislava						
Faculty: Faculty of Mathematics, Physics and Informatics						
Course ID: FMFL.KDMFI+KAG/2- UXX-852/22			Course title: Teaching Practice B (2)			
Educational activities: Type of activities: practice Number of hours: per week: per level/semester: 10d Form of the course: on-site learning						
Number of credits: 2						
Recommended semester: 2.						
Educational level: 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: 60						
A	ABS	B	C	D	E	FX
98,33	0,0	0,0	1,67	0,0	0,0	0,0
Lecturers: RNDr. Michal Winczer, PhD., PaedDr. Peter Horváth, PhD., Mgr. Michaela Vargová, PhD., RNDr. Jana Chalmovianská, PhD., M. A. Linda Steyne, PhD., PaedDr. Mgr. Natália Kováčová, PhD.						
Last change: 22.08.2022						
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.						

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KDMFI/2-UFY-244/22		Course title: The Learning Sciences and Physics Education at Higher Secondary Schools			
Educational activities: Type of activities: course Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 4.					
Educational level: II.					
Prerequisites:					
Course requirements: During the semester, each student will lead a teaching unit in the role of a teacher with the use of aids prepared or borrowed on a chosen topic (70%). Discussions during presentation of peers is for 30%. Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50% Credits will be awarded if the student obtains at least 50%.					
Learning outcomes: Students will know selected current approaches to the sciences of learning and will be able to apply these to high school physics. The focus will be on the use of research teaching methods. Students will have experience in leading teaching sequences in a peer environment.					
Class syllabus: The course is designed as a set of teaching units prepared and presented by students, on predetermined topics, models work in the classroom. The content is focused on the topics of high school physics, while the focus is adapted to the current interest of students. The outputs will reflect mainly from the didactic side with regard to the results of the learning sciences. From atmospheric pressure to absolute temperature zero, mechanics, electromagnetism, optics, atomic and nuclear physics.					
Recommended literature:					
Languages necessary to complete the course: Slovak and 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: PaedDr. Peter Horváth, PhD.					

Last change: 18.06.2022

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavičková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFL.KDMFI/2-UFY-243/22		Course title: The Learning Sciences and Physics Education at Lower Secondary Schools			
Educational activities: Type of activities: course Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 4.					
Educational level: II.					
Prerequisites:					
Course requirements: During the semester, each student will lead a teaching unit in the role of a teacher with the use of aids prepared or borrowed on a chosen topic (70%). Discussions during presentation of peers is for 30%. Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50% Credits will be awarded if the student obtains at least 50%.					
Learning outcomes: Students will know selected current approaches to learning sciences and will be able to apply these to physics and science education in primary school. The focus is mainly on the use of research teaching methods, the development of critical and creative thinking and the building of transferable competencies. Students will have experience in leading teaching sequences in a peer environment.					
Class syllabus: The course is designed as a set of teaching units prepared and presented by students, on predetermined topics, models work in the classroom. The content is focused on the topics of physics and other science subjects of primary school, while the choice of contexts is adapted to the interests of students. The outputs will reflect mainly from the didactic side with regard to the results of the learning sciences.					
Recommended literature:					
Languages necessary to complete the course: Slovak and 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: PaedDr. Tünde Kozánek Kiss, PhD.

Last change: 18.06.2022

Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFLKTF/2-UFY-101/22		Course title: Theoretical Physics			
Educational activities: Type of activities: lecture / practicals Number of hours: per week: 2 / 2 per level/semester: 26 / 26 Form of the course: on-site learning					
Number of credits: 4					
Recommended semester: 1.					
Educational level: II.					
Prerequisites:					
Course requirements: During the semester the students chooses a project and presents it to the group (topic is related to those presented in lectures) – this is 60% of the final grade. The final exam has both a written and an oral part of the exam, together making up 40% of the final grade.					
Learning outcomes:					
Class syllabus:					
Recommended literature:					
Languages necessary to complete the course: Slovak and English					
Notes:					
Past grade distribution Total number of evaluated students: 88					
A	B	C	D	E	FX
50,0	17,05	12,5	12,5	6,82	1,14
Lecturers: doc. Mgr. Samuel Kováčik, PhD.					
Last change: 18.06.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					

COURSE DESCRIPTION

Academic year: 2026/2027					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFLKTF/2-UFY-236/22		Course title: Theory of Relativity			
Educational activities: Type of activities: lecture Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 4.					
Educational level: II.					
Prerequisites:					
Course requirements: Continuous assessment: tests (4x10 marks), teaching-learning sequences (2x10 marks) Exam: written (40 marks) Indicative rating scale: A 90%, B 80%, C 70%, D 60%, E 50%. Credits will not be awarded if a student scores less than 50%.					
Learning outcomes: Graduates will have a basic understanding of the theory of relativity by understanding selected materials for advanced high school physical education and selected popular science articles in the field.					
Class syllabus:					
Recommended literature:					
Languages necessary to complete the course: Slovak and 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. Eduard Masár, PhD.					
Last change: 18.06.2022					
Approved by: doc. RNDr. Peter Demkanin, PhD., doc. PaedDr. Mária Slavíčková, PhD., prof. RNDr. Ivan Kalaš, PhD.					