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## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚMV/ ALG2a/22		<b>Course name:</b> Algebra I			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 / 3 <b>Per study period:</b> 42 / 42 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 6					
<b>Recommended semester/trimester of the course:</b> 1.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> According to the results from the semester and in view of the results of the written and oral final exam..					
<b>Learning outcomes:</b> To acquire the methods of mathematical thinking and cognition. Gain basic knowledge of number theory related to divisibility, master the basic concepts of linear algebra and be able to apply them to specific problems and mathematical problems.					
<b>Brief outline of the course:</b> Divisibility in $\mathbb{Z}$ . Fields. Systems of linear equations, Gauss elimination. Maps, permutations. Computing with matrices. Determinants, Cramer rule.					
<b>Recommended literature:</b> T.S Blyth, E.F. Robertson: Basic linear algebra, Springer Verlag, 2001. K. Jänich: Linear algebra, Springer Verlag, 1991.					
<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 956					
A	B	C	D	E	FX
10.98	12.97	19.25	18.31	28.03	10.46
<b>Provides:</b> RNDr. Lucia Kőszegiová, PhD., Mgr. Martin Vodička, Dr. rer. nat., Mgr. Radka Schwartzová					
<b>Date of last modification:</b> 17.02.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚMV/ ALG2b/22		<b>Course name:</b> Algebra II			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 4 / 2 <b>Per study period:</b> 56 / 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 6					
<b>Recommended semester/trimester of the course:</b> 2.					
<b>Course level:</b> I.					
<b>Prerequisites:</b> ÚMV/ALG2a/22					
<b>Conditions for course completion:</b> According to tests and to the exam.					
<b>Learning outcomes:</b> To acquire the methods of mathematical thinking and cognition. To deepen and expand students' knowledge of systems of linear equations, to acquire basic knowledge about vector spaces, linear representations, polynomials and polynomial equations.					
<b>Brief outline of the course:</b> Linear spaces, bases. Rank of a matrix. Systems of homogeneous linear equations. Linear transformations. Ring, fields. Polynomials over a field. Factorization into irreducible factors, roots. Roots of complex numbers. Cubic equations. Polynomials with several unknowns, symmetric polynomials.					
<b>Recommended literature:</b> T. Katriňák a kol.: Algebra a teoretická aritmetika 1, Alfa Bratislava, 1985. A. Kurosh: Higher Algebra, Mir Publishers, 1975.					
<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 272					
A	B	C	D	E	FX
21.32	16.18	16.18	16.18	26.47	3.68
<b>Provides:</b> doc. RNDr. Miroslav Ploščica, CSc., RNDr. Lucia Kőszegyová, PhD.					
<b>Date of last modification:</b> 16.04.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ ALG1c/24	<b>Course name:</b> Algebra III
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 4 / 2 <b>Per study period:</b> 56 / 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 7	
<b>Recommended semester/trimester of the course:</b> 5.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> ÚMV/ALG1b/24 or ÚMV/ALG2b/22	
<b>Conditions for course completion:</b> Awarded according to continual evaluation, written and oral examination.	
<b>Learning outcomes:</b> The students learn basic concepts, theorems and methods of linear algebra, at the level necessary for applications in geometry and other parts of mathematics. They obtain knowledge about the fundamentals of group theory and ring theory, and about properties of the polynomial integral domains.	
<b>Brief outline of the course:</b> <ul style="list-style-type: none"> <li>- Affine spaces, subspaces and their positions.</li> <li>- Convex sets, convex polyhedrons.</li> <li>- Algebraic planes.</li> <li>- Eigenvalues and eigenvectors.</li> <li>- Similarity of matrices, rational and Jordan canonical form.</li> <li>- Bilinear and quadratic forms, Sylvester law.</li> <li>- Groups, subgroups, cyclic groups.</li> <li>- Normal subgroups, factorization, isomorphism theorems.</li> </ul>	
<b>Recommended literature:</b> G. Birkhoff, S. MacLane: Prehľad modernej algebry, Alfa Bratislava, 1979 M. Hejný a kol.: Geometria 1, SNP, Bratislava 1985 M. Sekanina a kol.: Geometrie 1, SNP Praha 1986 T. Katriňák a kol.: Algebra a teoretická aritmetika 1, Alfa Bratislava, 1985 D.A.R. Wallace: Groups, rings and fields, Springer, 1998	
<b>Course language:</b> Slovak	
<b>Notes:</b>	

<b>Course assessment</b>					
Total number of assessed students: 5					
A	B	C	D	E	FX
40.0	40.0	0.0	0.0	20.0	0.0
<b>Provides:</b> doc. RNDr. Miroslav Ploščica, CSc.					
<b>Date of last modification:</b> 04.03.2024					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ ATC/22	<b>Course name:</b> Algebra and number theory
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 3	
<b>Recommended semester/trimester of the course:</b> 4.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> ÚMV/ALG2b/22	
<b>Conditions for course completion:</b> It is based on the results of written checks carried out during the semester. Final evaluation is based on the results of written checks carried out during the semester, of test, written and oral exam.	
<b>Learning outcomes:</b> Obtain basic knowledge about groups and from the elementary number theory.	
<b>Brief outline of the course:</b> <ol style="list-style-type: none"> <li>1. Congruences in the ring of integers</li> <li>2. The field of complex numbers</li> <li>3. Algebraic and transcendent numbers, minimal polynomial</li> <li>4. Simple extensions of the field of rationals</li> <li>5. The field of algebraic numbers</li> <li>6. The concept of group</li> <li>7. Symmetry groups</li> <li>8. Orders of elements, Lagrange theorem</li> <li>9. Normal subgroups, factorization</li> <li>10. Homomorphism theorems</li> </ol>	
<b>Recommended literature:</b> G.Birkoff, S. MacLane: A Survey of Modern Algebra, New York 1965 M. Harminc: Elementárna teória čísel (1.časť), PF UPJŠ Košice 2012 T. Katriňák a kol.: Algebra a teoretická aritmetika 1, Alfa Bratislava 1985 A. Legén: Grupy, okruhy a zväzy, Alfa Bratislava 1980 I.R. Shafarevich: Basic Notions of Algebra, Springer, 2005	
<b>Course language:</b> Slovak	
<b>Notes:</b>	



<b>Course assessment</b>					
Total number of assessed students: 368					
A	B	C	D	E	FX
12.5	18.75	24.18	22.01	20.38	2.17
<b>Provides:</b> doc. RNDr. Miroslav Ploščica, CSc.					
<b>Date of last modification:</b> 23.08.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ATA/24	<b>Course name:</b> Algebra and theoretical arithmetic
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 2 <b>Per study period:</b> 28 / 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 4	
<b>Recommended semester/trimester of the course:</b> 5.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> During the term, each student receives marks for two written exams. Final marking is assigned based on the overall points for the work throughout the term, for homework and their presentation. Marking classification: A:91%-100%, B:81%-90%, C:71%-80%, D:61%-70%, E:51%-60%, FX:0%-50%	
<b>Learning outcomes:</b> Obtain knowledge about sets $N$ , $Z$ , $Q$ and $R$ , about their axiomatic building-up, the operations and the orderings on them. The student will <ol style="list-style-type: none"> <li>1. familiarise themselves with mathematical culture, ways of thinking, self-expression and putting forward arguments,</li> <li>2. gain a deeper understanding of the base terminology of real analysis, their properties and interconnections,</li> <li>3. be able to define and interpret key terms, prove their basic properties and relationships,</li> <li>4. know how to solve tasks focused on utilising the aforementioned concepts and interpret the obtained results.</li> </ol>	
<b>Brief outline of the course:</b> Ordered Domains, Axioms for Rings, Construction for Rings, Definition and Properties of the Integers, Number-Theoretic Properties of the Integers, The Rational Numbers, The Arithmetic of the Rational Numbers, Integral Domains and Quotient Fields, The Arithmetic of Sequences, Cantor Sequences, Null Sequences, The Real Numbers, Ordered Fields, Relations between Ordered Fields and the Field of Rational Numbers, the Completeness of the Real Numbers, more Theorems on Ordered and Complete, Ordered Fields, the Isomorphism of Complete, Ordered Fields, the Complex Numbers	
<b>Recommended literature:</b> T. Katriňák, M. Gavalec, E. Gedeonová, J. Smítal: Algebra a teoretická aritmetika (1), Alfa, Bratislava, 1985.	

T. Šalát, A. Haviar, T. Hecht, T. Katriňák: Algebra a teoretická aritmetika (2), Alfa, Bratislava, 1986.  
 G. Birkhoff, S. Mac Lane: Prehľad modernej algebry, Alfa, Bratislava, 1979.  
 N. T. Hamilton, J. Landin: Set Theory. The Structure of Arithmetic, Dover Publications, Inc., 2018.

**Course language:**

Slovak

**Notes:**

**Course assessment**

Total number of assessed students: 69

A	B	C	D	E	FX
44.93	26.09	14.49	13.04	1.45	0.0

**Provides:** prof. RNDr. Jozef Doboš, CSc.

**Date of last modification:** 26.03.2024

**Approved:** prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KPE/ ALP/06		<b>Course name:</b> Alternative Education			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 4.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 362					
A	B	C	D	E	FX
67.68	25.14	4.14	0.55	0.28	2.21
<b>Provides:</b> Mgr. Zuzana Vagaská, PhD.					
<b>Date of last modification:</b> 12.03.2024					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚCHV/ ANCHU/21		<b>Course name:</b> Analytical Chemistry			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 / 1 <b>Per study period:</b> 42 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 5					
<b>Recommended semester/trimester of the course:</b> 3.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> 1. 3x test of analytical calculations (each 33%, minim. 50%). 2. Examination is composed of 3 questions (each for 33%, it is necessary to reach at least 50%).					
<b>Learning outcomes:</b> Survey of basic principles and tasks of analytical chemistry and applications of analytical methods in research and practice.					
<b>Brief outline of the course:</b> Subject and role of analytical chemistry. General principles and procedures - sampling, sample pre-treatment. Preparation of solutions. Evaluation of the results. Classification of analytical reactions. Qualitative analysis of cations and anions. Basic principles of organic analysis. Methods of quantitative analysis. General principles of gravimetry. Volumetric analysis. Instrumental methods of analytical chemistry (basic principles, instrumentation and applications) - electroanalytical, optical and separation methods.					
<b>Recommended literature:</b> D. Harvey, Modern Analytical Chemistry. McGraw Hill, Boston, 2000 Skoog D.A., Principles of Instrumental Analysis. Saunders Col. Publishing, New York 1985					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 101					
A	B	C	D	E	FX
30.69	17.82	20.79	19.8	6.93	3.96
<b>Provides:</b> doc. RNDr. Taťána Gondová, CSc.					
<b>Date of last modification:</b> 12.11.2021					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚCHV/ BPO/21		<b>Course name:</b> Bachelor Thesis and its Defence			
<b>Course type, scope and the method:</b> <b>Course type:</b> <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b>					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b> Oral presentation of the thesis results. Answering questions of the thesis oponent or members of the state examination board.					
<b>Recommended literature:</b>					
<b>Course language:</b> slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 27					
A	B	C	D	E	FX
88.89	11.11	0.0	0.0	0.0	0.0
<b>Provides:</b>					
<b>Date of last modification:</b> 07.12.2021					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ BKPa/22	<b>Course name:</b> Bachelor project I
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 1 <b>Per study period:</b> 14 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 1	
<b>Recommended semester/trimester of the course:</b> 5.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> To prepare and present a contribution related to thesis and its topic.	
<b>Learning outcomes:</b> To get students familiar with basic knowledge on the form and content of thesis and thesis presentation as well as with the support for its realisation.	
<b>Brief outline of the course:</b> Necessary elements and formal aspects of a thesis. WYSIWYG editors, LaTeX, drawing programs. Presentation software, Microsoft PowerPoint and its clones, Beamer. Suggestions for presentation and contribution making.	
<b>Recommended literature:</b> electronic information sources	
<b>Course language:</b> Slovak and English	
<b>Notes:</b>	
<b>Course assessment</b> Total number of assessed students: 134	
abs	n
100.0	0.0
<b>Provides:</b> prof. RNDr. Ondrej Hutník, PhD.	
<b>Date of last modification:</b> 24.08.2022	
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.	

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ BKPb/22	<b>Course name:</b> Bachelor project II
<b>Course type, scope and the method:</b> <b>Course type:</b> <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 6.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b>	
<b>Learning outcomes:</b>	
<b>Brief outline of the course:</b>	
<b>Recommended literature:</b>	
<b>Course language:</b>	
<b>Notes:</b>	
<b>Course assessment</b> Total number of assessed students: 112	
abs	n
100.0	0.0
<b>Provides:</b>	
<b>Date of last modification:</b> 24.08.2022	
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.	



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ BPO/14	<b>Course name:</b> Bachelor thesis and its defence
<b>Course type, scope and the method:</b> <b>Course type:</b> <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 4	
<b>Recommended semester/trimester of the course:</b>	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> The bachelor thesis is the result of the student's own work. It must not show elements of academic fraud and must meet the criteria of good research practice defined in the Rector's Decision no. 21/2021, which lays down the rules for assessing plagiarism at Pavol Jozef Šafárik University in Košice and its components. Fulfillment of the criteria is verified mainly in the supervision process and in the process of thesis defense. Failure to do so is reason for disciplinary action.	
<b>Learning outcomes:</b> Evaluation of student's competences with respect to the profile of the graduate. The bachelor's thesis demonstrates mastery of the basics of theory and professional terminology of the field of study, acquisition of knowledge, skills and competencies in accordance with the declared profile of the graduate of the study program, as well as the ability to apply them creatively in solving selected field problems. The bachelor thesis may have elements of compilation. The student demonstrates the ability of independent professional work in terms of content, formal and ethical. Further details on the bachelor thesis are determined by Directive no. 1/2011 on the basic requirements of final theses and the Study Regulations of UPJŠ in Košice.	
<b>Brief outline of the course:</b> 1. Elaboration of the bachelor thesis in accordance with the instructions of the supervisor. 2. Presentation of the results of the bachelor's thesis before the examination commission. 3. Answering questions related to the topic of the bachelor thesis within the discussion.	
<b>Recommended literature:</b> The recommended literature is determined individually in accordance with the topic of the bachelor's thesis.	
<b>Course language:</b> Slovak	
<b>Notes:</b>	

<b>Course assessment</b>					
Total number of assessed students: 202					
A	B	C	D	E	FX
66.83	18.81	8.42	3.47	1.98	0.5
<b>Provides:</b>					
<b>Date of last modification:</b> 19.04.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚCHV/ BKPa/22	<b>Course name:</b> Bakalársky projekt I
<b>Course type, scope and the method:</b> <b>Course type:</b> <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 3	
<b>Recommended semester/trimester of the course:</b> 5.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b>	
<b>Learning outcomes:</b>	
<b>Brief outline of the course:</b>	
<b>Recommended literature:</b>	
<b>Course language:</b>	
<b>Notes:</b>	
<b>Course assessment</b> Total number of assessed students: 33	
abs	n
100.0	0.0
<b>Provides:</b>	
<b>Date of last modification:</b> 07.02.2022	
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.	

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚCHV/ BKPb/22	<b>Course name:</b> Bakalársky projekt II
<b>Course type, scope and the method:</b> <b>Course type:</b> <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 3	
<b>Recommended semester/trimester of the course:</b> 6.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b>	
<b>Learning outcomes:</b>	
<b>Brief outline of the course:</b>	
<b>Recommended literature:</b>	
<b>Course language:</b>	
<b>Notes:</b>	
<b>Course assessment</b> Total number of assessed students: 26	
abs	n
100.0	0.0
<b>Provides:</b>	
<b>Date of last modification:</b> 07.02.2022	
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.	

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚCHV/ MIN1/14	<b>Course name:</b> Basis of Mineralogy
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 5	
<b>Recommended semester/trimester of the course:</b> 4.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> ÚCHV/VCH/10 or ÚCHV/VCH/21 or ÚCHV/VCHU/10 or ÚCHV/ZAC2/10 or ÚCHV/VACH/10 or ÚCHV/CHG/09 or ÚCHV/ZCF/03 or ÚCHV/VCHU/15	
<b>Conditions for course completion:</b> Verification of theoretical knowledge and recognizing minerals. A semester project about selected minerals (40 %), a practical test from recognizing of minerals (30 %), a written examination (30 %). The student must obtain totally at least 51%. In a case of online education the practical test is canceled and the written examination contains more questions (60 %).	
<b>Learning outcomes:</b> To recognize the beauty of nature and to obtain basic knowledge from mineralogy. After completing the course, students will be familiar with the properties of commonly available minerals and will be able to recognize these minerals.	
<b>Brief outline of the course:</b> Basic terms and definitions, origin of minerals in nature. Basis of morphological and structural crystallography: characteristic properties of crystals, crystallographic laws, crystal structure, unit cells and their parameters, crystallographic systems with examples of minerals. Crystallochemistry: types of bonds and structures and their effect on the properties of minerals. Physical properties of minerals and their utilize in minerals classification. Basis of genetic and systematic mineralogy. Structure of silicates.	
<b>Recommended literature:</b> M. Košuth: Mineralógia. Elfa, s.r.o. Košice, 2001 V. Radzo: Mineralógia, Alfa Bratislava, 1987.	
<b>Course language:</b> Slovak	
<b>Notes:</b> Teaching is carried out in person or, if necessary, online using the MS Teams tool. The form of teaching is specified by the teacher at the beginning of the semester, updated continuously.	

<b>Course assessment</b>					
Total number of assessed students: 149					
A	B	C	D	E	FX
81.88	16.11	0.67	0.67	0.0	0.67
<b>Provides:</b> doc. RNDr. Ivan Potočník, PhD.					
<b>Date of last modification:</b> 21.07.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚCHV/ BCHU/21	<b>Course name:</b> Biochemistry
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 / 1 <b>Per study period:</b> 42 / 14 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 5	
<b>Recommended semester/trimester of the course:</b> 5.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> ÚCHV/VCHU/10 or ÚCHV/VCHU/15 or ÚCHV/VACH/10 or ÚCHV/VCHU/14	
<b>Conditions for course completion:</b> Successful completion of the exam, which consists of two parts: (i) written and (ii) oral part. The student passes the exam if he / she obtains at least 60% of the points in the written part and at the same time adequately answers the asked questions in the oral part.	
<b>Learning outcomes:</b> Gain knowledge of: (i) the basic building blocks of biomacromolecules (proteins, DNA, RNA, fats and sugars) and their properties, (ii) the basic biochemical processes that take place in living organisms, (iii) the way energy is produced and used in cells.	
<b>Brief outline of the course:</b> 1. Protein Structure and Function, Exploring proteins. 2. DNA and RNA and the Flow of Genetic Information, Exploring genes. 3. Enzymes: Basic Concepts and Kinetics, Catalytic Strategies and Regulatory Strategies. 4. Carbohydrates (Monosaccharides, Disaccharides, Polysaccharides – Functions and Properties). 5. Lipids and Cells Membranes, Membrane Channels and Pumps. 6. Metabolism: Basic Concepts and Design, Signal-Transduction Pathways. 7. Glycolysis and Gluconeogenesis, Glycogen Metabolism. 8. The Citric Acid Cycle and Glyoxylate Cycle. 9. Oxidative Phosphorylation, The Light Reactions of Photosynthesis. 10. The Calvin Cycle and the Pentose Phosphate Pathway. 11. Fatty Acids Metabolism, Urea Cycle. 12. DNA Replication, Transcription (RNA Synthesis). 13. Protein Synthesis & Degradation, the Integration of Metabolism.	
<b>Recommended literature:</b>	
<b>Course language:</b>	
<b>Notes:</b>	

<b>Course assessment</b>					
Total number of assessed students: 106					
A	B	C	D	E	FX
29.25	13.21	13.21	18.87	19.81	5.66
<b>Provides:</b> prof. RNDr. Erik Sedlák, DrSc., RNDr. Nataša Tomášková, PhD., prof. RNDr. Mária Kožurková, CSc., Mgr. Mária Tomková, PhD.					
<b>Date of last modification:</b> 14.11.2021					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚCHV/BCH1b/10		<b>Course name:</b> Biochemistry II			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 / 1 <b>Per study period:</b> 42 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 5					
<b>Recommended semester/trimester of the course:</b> 6.					
<b>Course level:</b> I.					
<b>Prerequisites:</b> ÚCHV/BCH1a/03 or ÚCHV/BCHU/21 or ÚCHV/BCH1a/21					
<b>Conditions for course completion:</b> Test and oral examination.					
<b>Learning outcomes:</b> The aim of biochemistry teaching is to acquire knowledge in the field of living organisms on the basis of their molecular structure information on cell metabolism.					
<b>Brief outline of the course:</b> Basic principle of metabolism, basic metabolic pathways and cycles, integration of cell metabolism.					
<b>Recommended literature:</b> Koolman J., Roehm K.H.: Color atlas of biochemistry. Thieme, Stuttgart, Germany, 2005. Kodíček M., Valentová O., Hynek R.: Biochemie, chemický pohled na biologický svět, Vysoká škola chemicko-technologická v Praze, Praha, 2022.					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 397					
A	B	C	D	E	FX
9.82	19.14	31.49	17.63	20.91	1.01
<b>Provides:</b> prof. RNDr. Mária Kožurková, CSc., prof. RNDr. Erik Sedlák, DrSc., doc. RNDr. Rastislav Varhač, PhD., doc. RNDr. Viktor Víglaský, PhD., RNDr. Nataša Tomášková, PhD., RNDr. Danica Sabolová, PhD., univerzitná docentka					
<b>Date of last modification:</b> 26.07.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚCHV/ PBCHU/15	<b>Course name:</b> Biochemistry Practical
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 4 <b>Per study period:</b> 56 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 4	
<b>Recommended semester/trimester of the course:</b> 6.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> ÚCHV/BCHU/03 or ÚCHV/BCHU/21	
<b>Conditions for course completion:</b> Active participation with a maximum of one excused absence without the need for compensation. In case of excused absence from two or more practical exercises (e.g. due to illness), the student agrees with the teacher on alternative dates for practice. Correctly prepared protocols from all completed tasks. At least 51% of points from each of the written tests.	
<b>Learning outcomes:</b> To allow students to get practical experience in experimental techniques and methods, currently used in a biochemical research: UV/VIS spectrophotometry, thin layer chromatography (TLC), gel electrophoresis, isolation of macromolecules and substances from biological materials and their quantitative and qualitative determination.	
<b>Brief outline of the course:</b> <ol style="list-style-type: none"> <li>1. Biochemistry laboratory safety rules. Basic biochemical laboratory procedures.</li> <li>2. Qualitative tests for amino acids and proteins.</li> <li>3. Isolation of casein from milk. Determination of protein concentration by Lowry method.</li> <li>4. Determination of the iodine number by Yasud method . Soap production. Reactions with soap. Oxidation of unsaturated fatty acids.</li> <li>5. Saponification number of fats and oils. Qualitative test for cholesterol: Salkowsky reaction.</li> <li>6. Qualitative tests for carbohydrates. Determination of reducing carbohydrates by the Schoorl's method.</li> <li>7. Determination of reducing and nonreducing carbohydrates in germinant plants.</li> <li>8. Time-dependent course of enzyme-catalyzed reaction: digestion of gelatin by trypsin.</li> <li>9. Determination of catalase activity and the first order rate constant. Effect of pH on alpha-amylase activity.</li> <li>10. Effect of substrate concentration on initial rate of reaction, determination of <math>K_m</math> and <math>V_{max}</math> for urease-catalyzed hydrolysis of urea.</li> <li>11. Isolation of DNA from spleen. Isolation of RNA from yeast. Qualitative tests for DNA and RNA components.</li> <li>12. Determination of vitamin C concentration by 2,4-dinitrofenylhydrazine. Determination of vitamins A, B1, and C.</li> </ol>	

13. Final evaluation of students.					
<b>Recommended literature:</b> Sedlák, Varhač, Danko, Paulíková, Podhradský: Praktické cvičenia z biochémie, 2020, <a href="https://unibook.upjs.sk/sk/chemia/1411-prakticke-cvicenia-z-biochemie">https://unibook.upjs.sk/sk/chemia/1411-prakticke-cvicenia-z-biochemie</a>					
<b>Course language:</b> Slovak					
<b>Notes:</b> Teaching is carried out in person.					
<b>Course assessment</b> Total number of assessed students: 260					
A	B	C	D	E	FX
78.85	17.31	2.69	0.77	0.38	0.0
<b>Provides:</b> prof. RNDr. Mária Kožurková, CSc., RNDr. Nataša Tomášková, PhD., doc. RNDr. Rastislav Varhač, PhD., RNDr. Danica Sabolová, PhD., univerzitná docentka, RNDr. Lukáš Trizna, PhD.					
<b>Date of last modification:</b> 19.11.2021					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚCHV/ BAC1/04		<b>Course name:</b> Bioinorganic Chemistry I			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 5					
<b>Recommended semester/trimester of the course:</b> 5.					
<b>Course level:</b> I., II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> Test or seminar works examination					
<b>Learning outcomes:</b> The basic knowledges about biometal interactions with biomolecules, biomaterials, biominerals, biocatalysis, metals in biology and medicine, metal-based drugs, toxic metals for biosystems and metals in the environment.					
<b>Brief outline of the course:</b> Metallic and non-metallic elements and their roles in biological systems (biometals, bulk biological elements, essential trace elements). Biocoordination compounds, bioligands. Biocatalyzers. Oxygen carriers and oxygen transport proteins. Photochemical process. Catalysis and regulation processes. Calcium biominerals and biomineralization. Toxic metals. Application of knowledge of bioinorganic chemistry in pharmacy, chemotherapy (e.g. platinum complexes in cancer therapy) radiodiagnostics, mineral biotechnology, ecology and in other branches of life.					
<b>Recommended literature:</b> 1. Shriver D. F., Atkins P. W., Overton T. L., Rourke J.P., Weller M.T., Armstrong F.A.: Shriver & Atkins. Inorganic Chemistry. Oxford University Press, Oxford 2006. 2. Kaim W., Schwederski B.: Bioinorganic Chemistry: Inorganic Elements in the Chemistry of Life. Wiley, Chichester 1998. 3. Wilkins P. C., Wilkins R. G.: Inorganic Chemistry in Biology. OCP, Oxford 1997.					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 386					
A	B	C	D	E	FX
41.71	27.72	19.17	5.96	5.18	0.26
<b>Provides:</b> prof. RNDr. Zuzana Vargová, Ph.D.					

<b>Date of last modification:</b> 28.10.2021
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚBEV/ BDD/05		<b>Course name:</b> Biology of Children and Adolescents			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 0 <b>Per study period:</b> 28 / 0 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 4., 6.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> Written test					
<b>Learning outcomes:</b> Acquisition of basic morphological and physiological knowledge about individual organs and systems of the human body with a focus on the specifics of childhood and adolescence. Familiarity with developmental and growth characteristics and with the most common diseases in these stages of ontogenesis.					
<b>Brief outline of the course:</b> Human ontogenesis. Postnatal development. Age specific features of skeletal and muscular, circulatory, respiratory, gastrointestinal and urinary systems. Reproductive system. Endocrine system. Nervous system. Age specifics of selected diseases and drug dependence arise. Human population and environment.					
<b>Recommended literature:</b> Drobný I., Drobná M.: Biológia dieťaťa pre špeciálnych pedagógov I. a II. Bratislava, PdF UK, 2000 Lipková V.: Somatický a fyziologický vývoj dieťaťa. Osveta Bratislava, 1980 Malá H., Klementa J.: Biológia detí a dorastu. Bratislava, SPN, 1989					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 1795					
A	B	C	D	E	FX
31.36	23.96	18.27	16.66	9.14	0.61
<b>Provides:</b> doc. RNDr. Monika Kassayová, CSc.					
<b>Date of last modification:</b> 20.04.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ ZBR/14	<b>Course name:</b> Bridge fundamentals
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 5.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Active participation on exercises.	
<b>Learning outcomes:</b> A student gets acquainted with fundamentals of the contract bridge, develops his/her logical thinking and consolidates his/her habits of positive social behaviour.	
<b>Brief outline of the course:</b> Bridge rules. Principles of the bidding system Standard American. Basic techniques of declarer's play. Basic techniques of the defence. Lead conventions, signals. Common bidding conventions. Selected advanced techniques of the card play. Partnership cooperation in the contract bridge. Bridge ethics.	
<b>Recommended literature:</b> T. Menyhért: Kurz bridžu 2013, <a href="http://new.bridgekosice.sk/kurz-bridzu-2013/">http://new.bridgekosice.sk/kurz-bridzu-2013/</a> R. Pavlicek: Learn To Play Bridge!, <a href="http://www.rpbridge.net/1a00.htm">http://www.rpbridge.net/1a00.htm</a> ACBL SAYC System Booklet, <a href="http://ebookbrowse.net/acbl-sayc-pdf-d201415187">http://ebookbrowse.net/acbl-sayc-pdf-d201415187</a>	
<b>Course language:</b> Slovak or English	
<b>Notes:</b> Minimum number of participants is 4.	
<b>Course assessment</b> Total number of assessed students: 41	
abs	n
97.56	2.44

<b>Provides:</b> doc. RNDr. Miroslav Ploščica, CSc., Mgr. Martin Vodička, Dr. rer. nat.
<b>Date of last modification:</b> 08.02.2022
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚCHV/ CHV1/99	<b>Course name:</b> Chemical calculations
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 1.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Successful completion of two written tests in the middle and at the end of the semester. Accomplished test is with minimal 50% of point. The exact dates will be determined after mutual consultation between the teacher and the students. The rating scale is determined as follows: A (100-91%), B (90-81%), C (80-71%), D (70-61%), E (60-51%), Fx (50- 0%).	
<b>Learning outcomes:</b> To teach students how to calculate material balances in the systems with or without chemical processes and how to calculate examples concerning the chemical equilibrium.	
<b>Brief outline of the course:</b> Expression of the clear matter amount and the system composition. Stoichiometric formula. Material balances for preparation, dissolving and mixing of solutions, and for separating of mixtures. Material balances for combined processes. Chemical equations and material balances in the systems with chemical processes. Acid-Base equilibrium and the pH calculations. The solubility product and solubility.	
<b>Recommended literature:</b> Potočník I.: Chemické výpočty vo všeobecnej a anorganickej chémii (skriptum), PF UPJŠ, Košice, 2017. <a href="https://unibook.upjs.sk/sk/chemia/843-chemicke-vypocty-vo-vseobecnej-a-anorganickej-chemii">https://unibook.upjs.sk/sk/chemia/843-chemicke-vypocty-vo-vseobecnej-a-anorganickej-chemii</a> Any chemical laboratory tables.	
<b>Course language:</b> SK - slovak	
<b>Notes:</b> The subject is carried out in person or, if necessary, remotely using the online platform Big Blue Button (BBB). The form of teaching is specified by the teacher at the beginning of the semester and updated continuously.	

<b>Course assessment</b>					
Total number of assessed students: 1805					
A	B	C	D	E	FX
26.81	19.0	21.99	19.39	11.58	1.22
<b>Provides:</b> doc. RNDr. Miroslav Almáši, PhD., Mgr. Nikolas Király, PhD.					
<b>Date of last modification:</b> 15.11.2021					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚCHV/ SCHM/21		<b>Course name:</b> Chemistry			
<b>Course type, scope and the method:</b> <b>Course type:</b> <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b>					
<b>Course level:</b> I.					
<b>Prerequisites:</b> (ÚCHV/OCHU/21 or ÚCHV/OCHU/03) and ÚCHV/ANCHU/21 and ÚCHV/ BCHU/21 and (ÚCHV/ACHU/21 or ÚCHV/ACHU/03) and (ÚCHV/FCHU/22 or ÚCHV/ FCHU/21 or ÚCHV/FCHU/10)					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 81					
A	B	C	D	E	FX
12.35	25.93	23.46	16.05	17.28	4.94
<b>Provides:</b>					
<b>Date of last modification:</b> 08.09.2021					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> KPPaPZ/KOM/25	<b>Course name:</b> Communication
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 4	
<b>Recommended semester/trimester of the course:</b> 3., 5.	
<b>Course level:</b> I., P	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> 1. Active participation in teaching (absence allowed max. 90 min.), 2. Implementation of assignments and presentation of assignments focused on the application of knowledge, skills and competence in the field of communication with a particular focus on teacher communication in the school environment. Detailed information in the electronic bulletin board of the subject in AIS2.	
<b>Learning outcomes:</b> The student will acquire knowledge and information about the basics of verbal and non-verbal communication, communication errors, assertive and non-violent communication. The content of the subject will be enriched with knowledge, skills and competencies necessary for the work of a teacher. The student is able to apply the acquired communication skills in practice, is able to apply effective principles and principles of communication with others, is able to anticipate and thus prevent possible misunderstandings, which will contribute to the development of his social and professional skills. The student will acquire the competencies to communicate effectively in work and personal life, especially in the school environment.	
<b>Brief outline of the course:</b> Basics of communication (Transmitter-receiver principle, "What is said is not equal to what is heard", "Internal dialogue", The concept of communication) Active listening (The most important criteria for active listening) Misunderstandings (How Misunderstandings Arise, How to Avoid Misunderstandings) Body language (What is body language, Active / passive body language, Dress psychology) Signs of Physical Expression, Disadvantages of Fake Physical Expression, Difference Between Active and Passive Body Expression Personality development (Voices in us, "child in me" - identification of one's own personality) Basics of assertive and non-violent communication. Specifics of communication in the school environment.	
<b>Recommended literature:</b> ROSENBERG, M. B. 2023. Nenásilná komunikácia. Aktuell. 234 s.	

VÝROST, Jozef - SLAMĚNÍK, Ivan. Sociální psychologie. 2., přepr. a rozš. vyd. Praha : GRADA, 2008. 408 s.

VÝROST, Jozef - SLAMĚNÍK, Ivan. Aplikovaná sociální psychologie I : Člověk a sociální instituce. 1. vyd. Praha : Portál, 1998. 384 s. ISBN 80-7178-269-6.

KOMÁRKOVÁ, Růžena - SLAMĚNÍK, Ivan - VÝROST, Jozef. Aplikovaná sociální psychologie III : Sociálněpsychologický výcvik. 1. vyd. Praha : Grada Publishing, 2001. 224 s.

VÝROST, Jozef - SLAMĚNÍK, Ivan. Aplikovaná sociální psychologie II. 1. vyd. Praha : Grada Publishing, 2001. 260 s.

**Course language:**

slovak

**Notes:**

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**Course assessment**

Total number of assessed students: 0

A	B	C	D	E	FX
0.0	0.0	0.0	0.0	0.0	0.0

**Provides:** PhDr. Anna Janovská, PhD., PhDr. Mojmír Trebuňák

**Date of last modification:** 04.02.2025

**Approved:** prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> KPPaPZ/ MANAG/25	<b>Course name:</b> Conflict Management
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week: 2 Per study period: 28</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 4	
<b>Recommended semester/trimester of the course:</b> 3., 5.	
<b>Course level:</b> I., P	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> The conditions for passing the course are as follows: 1. Active participation in exercises. Max. the missed range is 90 min. 2. Submission of the reflection on the selected topic within the specified time. Reflection topic: My strengths and weaknesses in conflict management. In a short presentation of their reflection, in the form of deconstruction, students will describe their strengths and weaknesses in the management of conflict situations with a focus on the application of knowledge, skills and competences needed in conflict situations in the work environment and the school environment. The evaluation of the course and its subsequent completion will be based on clearly and objectively set requirements, which will be set in advance and will not change. The aim of the assessment is to ensure an objective and fair mapping of the student's knowledge while adhering to all ethical and moral standards. There is no tolerance for students' fraudulent behavior, whether in the teaching process or in the assessment process.	
<b>Learning outcomes:</b> Successful mastery and demonstration of knowledge in the field of conflict management and control of basic rules. The method of teaching the subject will be oriented to the student. Lecturers will be interested in students' needs, expectations and opinions so as to encourage them to think critically by expressing respect and feedback on their opinions and needs. The content of the curriculum will be based on primary and high-quality sources that will reflect the topicality of the topics so as to ensure the connection of the curriculum with other subjects and also the connection of the curriculum with practice. Students will be expected to take an active approach in lectures and seminars with an emphasis on their independence and responsibility. The student is able to demonstrate an understanding of an individual's behavior in various conflict situations. The student is able to describe, explain and evaluate their own internal resources, competencies as well as limitations and weaknesses that are directly related to conflict management. The student is able to apply theoretical knowledge and principles of conflict resolution to everyday situations. After completing the course, students will be able to: a) express and summarize basic knowledge related to conflict management; b) understand the basic rules and dynamics of the origin, course	

and termination of the conflict; c) apply knowledge in practice, e.g. in the school environment; d) apply key competencies that increase the possibilities of their application in all areas of practice with a special focus on the work of a teacher. They will acquire knowledge from the theory of conflict management as well as capabilities and competences for solving them, e.g. in the context of school teams.

**Brief outline of the course:**

Disputes and their causes (Types of disputes, External influences, Be able to reveal the causes of disputes), Dispute origin (Levels of disputes, Escalation warning signals, Escalation removal strategies, Know how to explain escalation stages; How do I approach a dispute?) Dispute Resolution, Dispute Resolution Strategies, Dispute Discussion, Dispute Settlement Initiatives, Knowing how to handle a dispute and how to effectively resolve it), Dispute Resolution (Options, Public Struggle, Covert Struggle, Indefinite Postponement, Agreement, “Fair play”, compromise, cooperation, capitulation, escape or separation), Prevention (Structures that produce disputes, The meaning and purpose of disputes, Stages and steps of dispute resolution, What does a positive corporate culture mean? Dispute is an incentive for change)

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**

Total number of assessed students: 0

A	B	C	D	E	FX
0.0	0.0	0.0	0.0	0.0	0.0

**Provides:** Mgr. Ondrej Kalina, PhD., Mgr. Veronika Borgoňová, PhD.

**Date of last modification:** 04.02.2025

**Approved:** prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚCHV/ KCHU/03		<b>Course name:</b> Coordination Chemistry			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b> 5.					
<b>Course level:</b> I.					
<b>Prerequisites:</b> ÚCHV/ACHU/21					
<b>Conditions for course completion:</b> Final written exam					
<b>Learning outcomes:</b> The student acquires basic knowledge on the coordination compounds, preparation, isomerism and properties of coordination compounds as well as about the chemical bonding in coordination compounds.					
<b>Brief outline of the course:</b> 1. Definition and nomenclature of coordination compounds. 2. Central atom and ligands 3. Coordination numbers, coordination polyhedra. 4. Isomerism of coordination compounds 5. Preparation of coordination compounds 6. Stability of coordination compounds 7. Chemical bonding in coordination compounds.					
<b>Recommended literature:</b> J. Ribas: Coordination Chemistry, Wiley-VCH, Weinheim, 2008. J. C. Huheey, E. A. Keiter, R. L. Keiter: Inorganic Chemistry, Haper Collins, New York, 1993. G. A. Lawrance: Introduction to Coordination Chemistry, Wiley, 2010.					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 106					
A	B	C	D	E	FX
40.57	24.53	13.21	8.49	11.32	1.89
<b>Provides:</b> prof. RNDr. Juraj Černák, DrSc., doc. RNDr. Juraj Kuchár, PhD.					
<b>Date of last modification:</b> 10.09.2021					



**Approved:** prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ DSMa/10	<b>Course name:</b> Discrete mathematics I
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 2 <b>Per study period:</b> 28 / 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 5	
<b>Recommended semester/trimester of the course:</b> 3.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Examination.	
<b>Learning outcomes:</b> To be familiar with some factual knowledge of combinatorics and graph theory. To understand and appreciate mathematical notions, definitions, and proofs, to solve problems requiring more than just standard recipes, and to express mathematical thoughts precisely and more rigorously.	
<b>Brief outline of the course:</b> Basic principles. Counting and binomial coefficients, Binomial theorem, polynomial theorem. Recurrence: Some miscellaneous problems, Fibonacci-type relations, Using generating functions, miscellaneous methods. The inclusion-exclusion principle. Rook polynomials. Introduction to graphs: The concept of graphs, paths in graphs. Connectivity. Trees, bipartite graphs. Planarity. Polyhedra. Traveling round a graph: Eulerian graphs, Hamiltonian graphs. Partitions and colourings: Vertex colourings of graphs. Edge colourings of graphs	
<b>Recommended literature:</b> 1. I. Anderson, A first course in discrete mathematics, Springer-Verlag London, 2001. 2. J. Matoušek and J. Nešetřil, Invitation to discrete mathematics, Oxford University Press Inc. , New York 1999. 3. S. Jendroľ, P. Mihók: Diskrétna matematika I, UPJŠ Košice 1992.	
<b>Course language:</b> Slovak	
<b>Notes:</b>	

<b>Course assessment</b>					
Total number of assessed students: 792					
A	B	C	D	E	FX
13.26	13.13	16.54	19.95	30.3	6.82
<b>Provides:</b> doc. RNDr. Roman Soták, PhD., RNDr. Alfréd Onderko, PhD.					
<b>Date of last modification:</b> 16.04.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ DSM2b/22	<b>Course name:</b> Discrete mathematics II
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 2 <b>Per study period:</b> 28 / 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 4	
<b>Recommended semester/trimester of the course:</b> 4., 6.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> ÚMV/DSMa/10 or ÚMV/DSM3a/10	
<b>Conditions for course completion:</b> In the covered areas of graph theory, the ability to formulate definitions and statements, to present proofs of statements, to explain individual steps in proofs and to solve selected problems related to given topics is required. During the semester (continuous assessment) two tests take place, from which 50% of points can be obtained, and from the oral exam alike 50% can be obtained. Evaluation: A ... at least 90%, B ... at least 80%, C ... at least 70%, D ... at least 60%, E ... at least 50%, FX ... less than 50% .	
<b>Learning outcomes:</b> Acquired knowledge of basic areas of graph theory, overview of used objects and properties, understanding of important statements and methods, knowledge of possible applications and the ability to formulate and solve problems in this area.	
<b>Brief outline of the course:</b> - (week 1) Introduction to graphs (graph relations, graph operations, special graph classes) - (week 2-3) Connectivity and distance in graphs (connectedness of vertices, eccentricity, incidence matrix) - (week 4) (Spanning) Trees (trees isomorphism) - (week 5-6) Connectivity in graphs (vertex and edge k-connectedness) - (week 7-8) Independence and coverings (independent set, matching, vertex and edge covering) - (week 9-10) Extremal graph theory (Ramsey numbers, Turán graphs) - (week 11-13) Graph colorings (vertex coloring, chromatic polynomial, edge coloring) - (week 14) Directed graphs (strong/weak connectedness, tournaments, acyclic graphs)	
<b>Recommended literature:</b> 1. A. Bondy, U.S.R. Murty, Graph theory, Springer, 2008 2. G. Chartrand, L. Lesniak, P. Zhang, Graphs and digraphs, CRC Press, 2011 3. R. Diestel, Graph Theory, Springer, 2017 4. D. West, Introduction to Graph Theory, Pearson, 2001	
<b>Course language:</b> Slovak	
<b>Notes:</b>	

<b>Course assessment</b>					
Total number of assessed students: 247					
A	B	C	D	E	FX
14.57	11.74	25.1	24.7	18.62	5.26
<b>Provides:</b> RNDr. Igor Fabrici, Dr. rer. nat., RNDr. Alfréd Onderko, PhD.					
<b>Date of last modification:</b> 16.04.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> KPPaPZ/PUDB/15	<b>Course name:</b> Drug Addiction Prevention in University Students
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week: 2 Per study period: 28</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 3., 5.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> 1st of the evaluation: active participation in the training part (30p). 2nd part of the evaluation: active participation in workshops (20p). In total, students can get 50p and the final evaluation is as follows: 50 - 45: A; 44 - 40: B; 39-35: C; 34-30: D; 29 - 25: E 24 and less: FX. Detailed information in the electronic bulletin board of the course in AIS2. The teaching of the subject will be realized by a combined method.	
<b>Learning outcomes:</b> The student understands the principals of research data based prevention of risk behavior, can describe and explain the determinants of risk behavior as well as protective and risk factors for substance use. Student understands and adequately interprets the theory explaining the background of substance and non-substance addictions. The student is also able to state and classify the types and forms of prevention, strategies and approaches in prevention, can distinguish effective strategies from ineffective ones. The student is able to adequately interpret their experience with preventive activities in the group and assume their positive effect as well as limitations and threats.	
<b>Brief outline of the course:</b>	
<b>Recommended literature:</b> Orosová, O. a kol. (2012). Základy prevencie užívania drog a problematického používania internetu v školskej praxi. Košice: UPJŠ. Sloboda, Z., & Bukoski, J. (Eds.). (2006). Handbook of Drug Abuse Prevention: Theory, Science, and Practice. New York: Springer. National and international scientific journals.	
<b>Course language:</b> slovak	
<b>Notes:</b>	

<b>Course assessment</b>					
Total number of assessed students: 663					
A	B	C	D	E	FX
79.34	14.93	3.92	1.36	0.15	0.3
<b>Provides:</b> prof. PhDr. Oľga Orosová, CSc., Mgr. Janka Liptáková, PhDr. Anna Janovská, PhD., Mgr. Zuzana Michalove					
<b>Date of last modification:</b> 24.06.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚINF/EDS/15	<b>Course name:</b> Educational software
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 5.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Conditions for ongoing evaluation: 1. Creation of a worksheet for student. 2. Creation of a multimedia educational game. 3. Creation of an interactive educational quiz. 4. Creation of an instructional educational video. Conditions for the final evaluation: Creation and presentation of final project on the use of educational software in education. Conditions for successful completion of the course: Obtaining at least 50% of points for ongoing and final assignments.	
<b>Learning outcomes:</b> Students will receive, resp. deepen their basic skills in working with: a) presentation software, programs for creating and editing images, animations, diagrams, sounds, conceptual maps, b) programs for the creation of didactic tests, questionnaires, surveys, c) simulation and modeling software, d) selected subject-oriented educational programs, Students present and discuss their idea of the use of educational software and educational Internet resources and tools in the selected school subject.	
<b>Brief outline of the course:</b> 1. Overview of educational software and educational web resources and tools. 2. Creating and processing of materials for teaching aid . 3. Creation and use of electronic and interactive educational documents (worksheets, presentations, textbooks and workbooks). 4. Creation of instructional educational video. 5. Electronic voting and questionnaire creation. 6. Creation of didactic tests and educational games. Gamification elements, tools and environments. 7. Collaborative web applications. 8. Online communication tools. 9. Complex online learning environments.	



10. Online educational platforms, repositories, projects and competitions. 11. Simulations and modelling. Subject-focused educational programmes. 12. Use digital tools to plan, monitor, differentiate and personalise learning. Accessibility of digital tools and learning resources.					
<b>Recommended literature:</b> SOLOMON, Gwen and Lynne SCHRUM, 2014. Web 2.0 How-to for Educators. Second. International Society for Technology in Education, 314 p. ISBN 978-1564843517. STOBAUGH, Rebecca, 2019. Fifty Strategies to Boost Cognitive Engagement: Creating a Thinking Culture in the Classroom (50 Teaching Strategies to Support Cognitive Development). Solution Tree Press, 176 p. ISBN 978-1947604773. LEMOV, Doug, 2015. Teach Like a Champion 2. 0: 62 Techniques That Put Students on the Path to College [online]. 2nd edition. John Wiley & Sons, Incorporated, 509 p. [cited 2021-7-10]. ISBN 9781118898628. Available from: <a href="https://ebookcentral.proquest.com/lib/upjs-ebooks/detail.action?docID=1895720">https://ebookcentral.proquest.com/lib/upjs-ebooks/detail.action?docID=1895720</a> European Schoolnet: Transforming education in Europe [online]. [cited 2021-7-10]. Available from: <a href="http://www.eun.org/home">http://www.eun.org/home</a> Science On Stage Europe [online]. Science on Stage Europe e.V. [cited 2021-7-10]. Available from: <a href="https://www.science-on-stage.eu/">https://www.science-on-stage.eu/</a>					
<b>Course language:</b> Slovak and partly English due to selected programs and information sources					
<b>Notes:</b> By default, teaching is carried out face to face. If this is not possible (eg due to a pandemic), teaching is provided at a distance through video conferencing programs and LMS.					
<b>Course assessment</b> Total number of assessed students: 106					
A	B	C	D	E	FX
76.42	11.32	7.55	0.0	4.72	0.0
<b>Provides:</b> Ing. Zuzana Tkáčová, Ing.Paed.IGIP.					
<b>Date of last modification:</b> 16.03.2024					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> CJP/ PFAJ4/07	<b>Course name:</b> English Language of Natural Science
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week: 2 Per study period: 28</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 4.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Active participation in class and completed homework assignments. Students are allowed to miss 2 classes at the most Continuous assessment: 1 credit test taken presumably in weeks 6/7 1 project (quiz on the topic of the student's field of study) 25% of the continuous assessment 5 LMS quizzes (25% of the continuous assessment) In order to be admitted to the final exam, a student has to score at least 65 % from the continuous assessment The exam test results represent 50% of the final grade for the course, continuous assessment results represent the other 50% of the final grade. The final grade for the course will be calculated as follows: A 93-100, B 86-92, C 79-85, D 72-78, E 65-71, FX 64 and less.	
<b>Learning outcomes:</b> Enhancement of students' language skills (speaking, writing, reading and listening comprehension) in English for specific and academic purposes and development of students' linguistic competence. Students obtain knowledge of selected phonological, lexical and syntactic aspects of professional English, improve their pragmatic competence - students can effectively use the language for a given purpose, and acquire presentation skills at B2 level (CEFR) with focus on terminology of natural sciences.	
<b>Brief outline of the course:</b> 1. Introduction to studying language 2. Selected aspects of scientific language 3. Talking about academic study 4. Discussing science 5. Defining scientific terminology and concepts 6. Expressing cause and effect 7. Describing structures 8. Explaining processes 9. Comparing objects, structures and concepts	

10. Talking about problem and solution 11. Referencing authors 12. Giving examples 13. Visual aids and numbers 14. Referencing time and place Presentation topics related to students' study fields.					
<b>Recommended literature:</b> lms.upjs.sk - e-kurz Odborný anglický jazyk pre prírodné vedy. Redman, S.: English Vocabulary in Use, Pre-intermediate, Intermediate. Cambridge University Press, 2003. Armer, T.: Cambridge English for Scientists. CUP, 2011. Wharton J.: Academic Encounters. The Natural World. CUP, 2009. P. Fitzgerald : English for ICT studies. Garnet Publishing, 2011. <a href="https://worldservice/learningenglish">https://worldservice/learningenglish</a> , <a href="https://spectator.sme.sk">https://spectator.sme.sk</a> <a href="http://www.isllibrary.com">www.isllibrary.com</a> <a href="http://linguahouse.com">linguahouse.com</a>					
<b>Course language:</b> English, level B2 (CEFR)					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 3246					
A	B	C	D	E	FX
38.63	26.31	16.3	9.52	7.18	2.06
<b>Provides:</b> Mgr. Viktória Mária Slovenská					
<b>Date of last modification:</b> 06.02.2024					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚCHV/ PCH1/00		<b>Course name:</b> Food chemistry			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b> 5.					
<b>Course level:</b> I., II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> Active work during semester, presentation on certain theme. Two exams, one in the middle and second at the end of semester (min. 51%). A: 91-100b, B: 81-90b, C: 71-80b, D: 61-70b, E: 51-60b, FX: 0-50b.					
<b>Learning outcomes:</b> Students will receive informations and knowledges about chemical substances in food, their importance and chemical changes in food during processing and storage.					
<b>Brief outline of the course:</b> The main categories of substances in the most important group of food. Aminoacids, proteins, lipids, carbohydrates. Water, minerals, low concentration anorganic compounds, vitamins. Hydrocarbons, colorants, toxic compounds, aditives. Chemical reactions in dairy products.					
<b>Recommended literature:</b>					
<b>Course language:</b> english					
<b>Notes:</b> Teaching is carried out in person or, if necessary, online using the MS Teams or BBB (BigBlueButton) tool. The form of teaching is specified by the teacher at the beginning of the semester, updated continuously.					
<b>Course assessment</b> Total number of assessed students: 334					
A	B	C	D	E	FX
69.76	26.05	3.89	0.0	0.0	0.3
<b>Provides:</b> RNDr. Ján Elečko, PhD.					
<b>Date of last modification:</b> 28.01.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ FRPa/19	<b>Course name:</b> Function of real variable
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 4 <b>Per study period:</b> 28 / 56 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 7	
<b>Recommended semester/trimester of the course:</b> 1.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Continuous assessment of student's work during the semester (submission of compulsory homework, writing three tests). Final test and oral discussion on the topics of the subject.	
<b>Learning outcomes:</b> The course provides an introductory knowledge on basic tools of differential and integral calculus of real functions of one real variable, and a development of certain calculation skills in the field.	
<b>Brief outline of the course:</b> <ol style="list-style-type: none"> <li>1. Basics of mathematical logic and notations (1 week)</li> <li>2. Real functions - basic notions, operation, graphs and their transformations (2 weeks)</li> <li>3. Continuity of a real-valued function (1 week)</li> <li>4. Derivative of a function using the geometric concepts, rules of differentiation (2 weeks)</li> <li>5. Basic of differential calculus - relations with monotonicity and convexity, extremas, using in optimisation, geometric and physics tasks (2 weeks)</li> <li>6. Primitive function, methods of their finding (3 weeks)</li> <li>7. Newton definite integral - methods of its computation, using in geometric and physics tasks (2 weeks)</li> </ol>	
<b>Recommended literature:</b> <ol style="list-style-type: none"> <li>1. Kulcsár, Š. - Kulcsárová, O.: Zbierka úloh z matematickej analýzy I., UPJŠ, 2002.</li> <li>2. Kulcsár, Š. - Kulcsárová, O.: Zbierka úloh z matematickej analýzy II., UPJŠ, 2003.</li> <li>3. Hutník, O. - Kulcsár, Š. - Kulcsárová, O. - Mojsej, I.: Zbierka úloh z matematickej analýzy III., UPJŠ, 2011.</li> <li>4. Demidovič, B. P.: Sbírka úloh a cvičení z matematické analýzy, Fragment, Praha, 2003.</li> <li>5. Brannan, D.: A First Course in Mathematical Analysis, Cambridge University Press, Cambridge 2006.</li> <li>6. Bruckner, A. M., Bruckner J. B., Thomson, B. S.: Real Analysis, Second Edition, ClassicalRealAnalysis.com, 2008.</li> <li>7. Zorich, V. A.: Mathematical Analysis I, Springer-Verlag 2002.</li> </ol>	
<b>Course language:</b> Slovak	

<b>Notes:</b>					
<b>Course assessment</b>					
Total number of assessed students: 946					
A	B	C	D	E	FX
8.25	8.14	17.12	20.3	29.7	16.49
<b>Provides:</b> prof. RNDr. Ondrej Hutník, PhD., RNDr. Lenka Halčinová, PhD., RNDr. Jana Borzová, PhD., RNDr. Miriam Kleinová, PhD., RNDr. Kristína Hurajová					
<b>Date of last modification:</b> 16.04.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚCHV/ BACHZ/06	<b>Course name:</b> Fundamentals of Bioanalytical Chemistry
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 5	
<b>Recommended semester/trimester of the course:</b> 3.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Elaboration and presentation of a semester project with an assigned topic. Completion of block exercises. Oral examination. Detailed conditions for completing the subject are listed in the electronic bulletin board of the subject and in the repository of digital support materials LMS UPJŠ and are updated annually.	
<b>Learning outcomes:</b> After completing the course, the student has basic knowledge about biological samples, factors affecting biological samples and analytical methods used in clinical chemistry and bioanalysis.	
<b>Brief outline of the course:</b> Introduction to Bioanalytical Chemistry. Biological samples classification. Factors that affect analytes in biological samples. Collection, transport and storage of samples, the main principles of sampling, the suppressing of undesirable phenomena. Selected methods of pretreatment of biological samples. Analyzers, equipment and organization of work in a clinical laboratory. Control and management of quality in clinical laboratory. Quality manual, calibration, control, and reference materials. Validation and Good Laboratory Practice. Buffers in bioanalysis. Enzymes in bioanalysis, introduction, distribution, Mechanism of enzyme catalysis. The kinetics of enzymatic reactions with one substrate, the Michaelis constant, constant specificity, lag phase, kinetics of reactions with two substrates. Moderators of enzyme activity. Selected methods for the analysis of biomolecules.	
<b>Recommended literature:</b> 1. Chromý, V. a kol.: Bioanalytika, MU Brno, 2002 2. Kukačka, J. a kol.: Bioanalytická chemie v příkladech a cvičeních, Karolinum, 2010 3. Mikkelsen, S.R, Cortón E.: Bioanalytical Chemistry, Wiley, 2004 4. Wilson I.: Bioanalytical Separations 4, (Handbook of Analytical Separations), Elsevier, 2003 5. Lee, D.C., Webb, M.: Pharmaceutical Analysis, Blackwell, 2003	
<b>Course language:</b>	
<b>Notes:</b>	

If necessary, the teaching also takes place in a distance form with the use of various tools of LMS UPJŠ, MS teams, etc. The form of teaching is specified by the teacher at the beginning of the semester, it is continuously updated.

**Course assessment**

Total number of assessed students: 112

A	B	C	D	E	FX
33.04	30.36	31.25	4.46	0.0	0.89

**Provides:** doc. RNDr. Katarína Reiffová, PhD.

**Date of last modification:** 22.07.2022

**Approved:** prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚCHV/VCHU/15		<b>Course name:</b> General Chemistry			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 4 / 2 <b>Per study period:</b> 56 / 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 7					
<b>Recommended semester/trimester of the course:</b> 1.					
<b>Course level:</b> I.					
<b>Prerequisites:</b> ÚCHV/CHV1/99					
<b>Conditions for course completion:</b> Written test in the middle and the end of the semester followed by the oral examination. Active participation on seminars.					
<b>Learning outcomes:</b> To provide students with knowledge of atoms and molecules their electronic structure, theories of chemical bonds, physical and chemical properties of elements and compounds as well as their periodicity.					
<b>Brief outline of the course:</b> Main terms used in chemistry. Atoms – models of atoms, electron configuration, chemical periodicity and its effect on the properties of elements, radioactivity. Chemical bonds and intermolecular interactions. Chemical structure and physical properties of matter. State of matter. Solutions. Chemical equilibrium. Basis of chemical thermodynamics and chemical kinetics. Classification of chemical reactions. Electrochemistry.					
<b>Recommended literature:</b> 1. Atkins P., Jones L.: Chemical Principles, 2nd ed., Freeman, New York 2002. 2. Russel J.B.: General Chemistry, 2nd ed., McGraw Hill, London 1992.					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 413					
A	B	C	D	E	FX
24.7	27.36	28.09	12.35	6.78	0.73
<b>Provides:</b> prof. RNDr. Vladimír Zeleňák, DrSc., doc. RNDr. Ivan Potočník, PhD.					
<b>Date of last modification:</b> 07.02.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚCHV/ PACU/03	<b>Course name:</b> General Course of Analytical Chemistry - Laboratory
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 4 <b>Per study period:</b> 56 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 4	
<b>Recommended semester/trimester of the course:</b> 4.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> ÚCHV/ANCHU/03 or ÚCHV/ANCHU/21	
<b>Conditions for course completion:</b> Active participation in laboratory exercises and seminars; successful completion of the tests. 1. Participation in laboratory exercises is required. Assigned teacher who leads exercises might excuse without substitute the student's absence (incapacity for work, family reasons, etc.) for a maximum of two exercises during the semester with substitute supplying. 2. The assigned teacher, who leads the seminar, assesses the preparation of students and their activity in seminars. For the active participation in the exercises, the student can get a maximum of 10 points. 3. Two written tests are obligatory. The written test will consist of 15 questions with 15 points, together for 2 written testes of 30 points. To successful completion of the exam, it is necessary to achieve at least 8 points from each test. Overall score: Max. number of points: 50 (elaboration of protocols / assignments - 10 points; active participation in practical exercises - 10 points; written tests - $2 \times 15$ points). Min. number of points to successful completion of course: 26. Note: Detailed conditions are updated annually within the repository for digital support materials (LMS UPJŠ).	
<b>Learning outcomes:</b> Application of theoretical knowledge of qualitative and quantitative analytical chemistry into analytical laboratory practise.	
<b>Brief outline of the course:</b> Practical in qualitative and quantitative analysis. Qualitative analysis, separation by selective precipitation. Quantitative methods. Gravimetry, general principles of method. Volumetric methods. Preparation of accurate solutions. Indication of equivalency point. Titration curves, calculations in volumetric analysis. Acidimetry, alkalimetry. Manganometry. Iodometry. Complexometry. Selected Instrumental analytical methods.	
<b>Recommended literature:</b> 1. Y. Bazel a kol.: Praktikum z analytickej chémie, PF UPJŠ, Košice 2019. 2. T. Gondová a kol.: Praktikum z analytickej chémie, PF UPJŠ, Košice 1999. 3. V. Szmereková, P.Meľuch: Praktikum z analytickej chémie, PF UPJŠ, Košice 1988. 4. J. Labuda a kol. Analytická chémia, STU, Bratislava 2014. 5. Z. Holzbecher a kol: Analytická chemie, SNTL, ALFA Praha 1987.	

6. L. Koller: Analytická chémia, TU Košice, 2002, skriptum a v digitálnej forme. 7.D. Harvey: Modern Analytical Chemistry. McGraw Hill, Boston, 2000.					
<b>Course language:</b> Slovak					
<b>Notes:</b> The course is implemented by full-time or, if necessary, distance method using the MS Teams or BBB or a combined method. The form of teaching is specified by the teacher at the beginning of the semester and updated continuously.					
<b>Course assessment</b> Total number of assessed students: 425					
A	B	C	D	E	FX
60.0	26.82	10.59	1.41	1.18	0.0
<b>Provides:</b> RNDr. Rastislav Serbin, PhD., RNDr. Jana Šandrejová, PhD., univerzitná docentka					
<b>Date of last modification:</b> 15.11.2021					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ GEO2a/24	<b>Course name:</b> Geometry I
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 2 <b>Per study period:</b> 28 / 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 4	
<b>Recommended semester/trimester of the course:</b> 2.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> In the covered areas of geometry, the ability to formulate definitions and statements, to present proofs of statements, to explain individual steps in proofs and to solve selected problems related to given topics is required. During the semester (continuous assessment) a test take place, from which 50% of points can be obtained, and from the oral exam the remaining 50% can be obtained. Evaluation: A ... at least 90%, B ... at least 80%, C ... at least 70%, D ... at least 60%, E ... at least 50%, FX ... less than 50%	
<b>Learning outcomes:</b> Acquired knowledge about the axiom system of Euclidean geometry, about the validity of the basic tools of planimetry, about sets of points of a given property, about congruence transformations and homothety in the plane, about important points, lines and circles in triangles and about quadrilaterals and their properties. The ability to use the above knowledges and tools to solve problems on this area. A new look at classical geometric results.	
<b>Brief outline of the course:</b> - (week 1-3) Hilbert's axiom system (axioms, triangle congruence theorems, pairs of congruent or "complementary" angles, basic proportionality theorem, triangle similarity theorems) - (week 4-5) Basic tools of planimetry (Euclid's theorem, Pythagorean theorem, Thales' theorem, law of cosines, extended law of sines, central and inscribed angle theorem, area of a triangle) - (week 6) Point sets of the given property (bisectors, equidistants, Apollonius circle) - (week 7) Transformations (congruence transformations of the plane, homothety in the plane) - (week 8-11) Points and lines connected with a triangle (Menelaus's theorem, Ceva's theorem, points of interest, the incircle and excircles, pedal triangles, Euler line, nine-point circle, Simson lines) - (week 12-13) Quadrangles (Varignon's parallelogram, cyclic quadrangles, Ptolemy's theorem, Brahmagupta's formula)	
<b>Recommended literature:</b> 1. D. Hilbert, Grundlagen der Geometrie, Teubner, 1968. 2. H.G. Forder, Foundations of Euclidean geometry, Dover Publ., 1958. 3. H.S.M. Coxeter, S.L. Greitzer, Geometry revisited, MAA, 1967. 4. R.A. Johnson, Advanced Euclidean geometry, Dover Publ., 2007.	

5. D.A. Brannan, M.F. Esplen, J.J. Gray, Geometry, Cambridge Univ. Press, 2007.					
<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 104					
A	B	C	D	E	FX
12.5	9.62	27.88	18.27	23.08	8.65
<b>Provides:</b> RNDr. Igor Fabrici, Dr. rer. nat.					
<b>Date of last modification:</b> 29.02.2024					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ GEO2b/22	<b>Course name:</b> Geometry II
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 1 / 1 <b>Per study period:</b> 14 / 14 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 3.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> ÚMV/GEO2a/24	
<b>Conditions for course completion:</b> Mastering the terminology of stereometry, basic properties of geometric solids, understanding concepts, basic stereometric definitions and theorems. Understanding and using basic transformation methods for projection of solids, effective use of suitable methods in the construction of planar cutting bodies, in the construction of the intersection of a line with a solid and in solving metric problems. The conditions of the continuous assessment are active participation in the exercises, elaboration of home assignments and elaboration of two tests. Evaluation: A ... at least 90%, B ... at least 80%, C ... at least 70%, D ... at least 60%, E ... at least 50%, FX ... less than 50%	
<b>Learning outcomes:</b> An important result of education is the deepening and developing of knowledge of school stereometry and the development of the ability to apply a synthetic approach in deriving and proving relationships in stereometry and in their use in solving problems. The construction of solid images and problem solving will develop analytical thinking and spatial imagination of students.	
<b>Brief outline of the course:</b> <ul style="list-style-type: none"> <li>- basic properties of geometric solids in space,</li> <li>- images of solids in parallel projection,</li> <li>- basic stereometric theorems (relative positions of straight lines, parallelism of a line and a plane, parallelism of two planes, relative position of three planes, perpendicularity of a line and a plane, perpendicularity of two planes),</li> <li>- positional and metric properties of spatial solids (cuttings of polyhedrons, distances and angles of points, straight lines, planes, intersection of a straight line with a solid, intersection of planes),</li> <li>- properties of polyhedrons, Euler's theorem, regular polyhedrons (Platonic solids, their number and properties)</li> <li>- volume and surface area of solids and their parts, Cavalieri's principle</li> <li>- projection methods (principle of parallel and central projection, axial affinity, use of axial affinity in the construction of cuts of prisms and cylinders, basics of Monge's Projection).</li> </ul>	
<b>Recommended literature:</b> 1. Pomykalová, E.: Matematika pro gymnázia - Stereometrie. Prometheus, 2009.	

2. Šedivý, O., Pavlovičová, G., Rumanová, L., Vallo, D.: Stereometria. Umenie vidieť a predstavovať si priestor. Nitra, 2007. 3. Kuřina, F.: Deset pohledů na geometrii. Praha: MÚ AV ČR, 1996.					
<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 45					
A	B	C	D	E	FX
8.89	13.33	26.67	15.56	33.33	2.22
<b>Provides:</b> doc. RNDr. Stanislav Lukáč, PhD.					
<b>Date of last modification:</b> 20.04.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ GEO2c/22	<b>Course name:</b> Geometry III
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 2 <b>Per study period:</b> 28 / 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 4	
<b>Recommended semester/trimester of the course:</b> 4.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> ÚMV/ALG2b/22	
<b>Conditions for course completion:</b> Two written tests. Written and oral examinations For continuous evaluation - max. 40 points for the written test - max. 20 points for oral exams - max. 40 points) Final score: A: 100-91 points, B: 90-81, C: 80-71, D: 70-61, E: 60-51, F: less than 51 points Note: In each of the student needs to have at least 50% max. number of points	
<b>Learning outcomes:</b> Mastering the basics of the theory of linear and quadratic formations in the Affine and Euclidean space, mastering the methods of solving problems in analytical geometry in relation to the secondary school curriculum.	
<b>Brief outline of the course:</b> 1. Affine n-dimensional space - definition, linear coordinate system. 2. Subspace and its parametric expression, general equation of superplane, subspace as intersection of superstructures, general equations of subspace 3. Mutual position of subspaces, orientation of affine space, change of coordinate system 4. Arrangement of points on a line, half-spaces 5. Scalar product, external product, vector product of vectors and their basic properties 6. Euclidean space and its subspaces, Cartesian coordinate system 7. Perpendicularity of subspaces, distance of point from subspace, distance of point from superstructure, distance of subspaces, 8. Deviation of two lines, two superstructures, line and superplane, deviation of line and subspace 9. Axis of two extraterrestrial subspaces, Gram determinant, examples in E2 and E3	
<b>Recommended literature:</b> 1. M.Sekanina, L.Boček, M.Kočandrlé, J.Šedivý: Geometrie 1, SPN Praha 1986 2. M.Hejný, V.Zaťko, P.Kršňák: Geometria 1, SPN Bratislava 1985 3. J.Eliaš, J.Horváth, J.Kajan: Zbierka úloh z vyššej matematiky 1, Alfa Bratislava	



<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 227					
A	B	C	D	E	FX
19.38	23.35	22.03	17.62	10.13	7.49
<b>Provides:</b> doc. RNDr. Roman Soták, PhD., RNDr. Daniela Šabaková, Mgr. Diana Švecová					
<b>Date of last modification:</b> 17.04.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ GEO2d/22	<b>Course name:</b> Geometry IV
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 / 2 <b>Per study period:</b> 42 / 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 5	
<b>Recommended semester/trimester of the course:</b> 5.	
<b>Course level:</b> I., II.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> In the covered areas of geometry, the ability to formulate definitions and statements, to present proofs of statements, to explain individual steps in proofs and to solve selected problems related to given topics is required. During the semester (continuous assessment) two tests take place, from which 50% of points can be obtained, and from the oral exam alike 50% can be obtained. Evaluation: A ... at least 90%, B ... at least 80%, C ... at least 70%, D ... at least 60%, E ... at least 50%, FX ... less than 50%	
<b>Learning outcomes:</b> Acquired knowledge of the properties of affine, isometric and similarity transformations, understanding of important statements and methods, knowledge of the use of isometric and similarity transformations in construction and optimization problems and the ability to solve other problems in this area.	
<b>Brief outline of the course:</b> - (week 1-2) Quadric surfaces (circular and general quadric surfaces) - (week 3-7) Affine transformations (associated transformation, matrix representation, affinities, fixed points and lines, pseudo-reflections) - (week 8-10) Isometric transformations (matrix representation, isometries, classification in the plane, composition of reflections) - (week 11-12) Similarity transformations (matrix representation, similarities, homothety, composition of homotheties) - (week 13-14) Geometry of circles (the power of a point with respect to a circle, radical axis of two circles, pencils of circles)	
<b>Recommended literature:</b> 1. M. Sekanina et al, Geometry 2, SPN, 1988 (in slovak). 2. O. Šedivý et al, Geometry 2, SPN, 1987 (in slovak). 3. H.S.M. Coxeter, Introduction to geometry, Wiley, 1989. 4. J.T. Smith, Methods of geometry, Wiley, 2000.	
<b>Course language:</b> Slovak	

<b>Notes:</b>					
<b>Course assessment</b>					
Total number of assessed students: 216					
A	B	C	D	E	FX
15.74	15.28	23.61	20.83	18.52	6.02
<b>Provides:</b> RNDr. Igor Fabrici, Dr. rer. nat., RNDr. Daniela Šabaková					
<b>Date of last modification:</b> 14.04.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KPE/ POŽ/21		<b>Course name:</b> Getting to know the Student in Education			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 4.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 113					
A	B	C	D	E	FX
65.49	19.47	7.96	2.65	0.0	4.42
<b>Provides:</b> PaedDr. Michal Novocký, PhD., Mgr. Beáta Sakalová, PhD.					
<b>Date of last modification:</b> 12.03.2024					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KPE/ INP/17		<b>Course name:</b> Inclusive Pedagogy			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 5.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 138					
A	B	C	D	E	FX
71.74	21.74	2.9	1.45	2.17	0.0
<b>Provides:</b> PaedDr. Michal Novocký, PhD.					
<b>Date of last modification:</b> 14.09.2024					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ IPU/22	<b>Course name:</b> Informatics course for teachers of mathematics
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 1 / 1 <b>Per study period:</b> 14 / 14 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 6.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> To master the use of basic algorithmic structures, to gain the ability to write algorithms for the construction of geometric shapes in the environment of turtle geometry. To be able to assess the possibilities of using interactive applications available on the Internet and to design procedures for the application of selected applications in the teaching of mathematics. To learn to use numerical and graphical means of a spreadsheet in data analysis, creating models to solve various mathematical problems. Evaluation: Algorithm creation paper - 6 b Elaboration of dynamic constructions for solving geometric problems - 3 b Seminar work on the use of interactive applications - 7 b + 3 b Poll - 1 b Tasks for creating numerical and graphical models in a spreadsheet - 4 b Classification scale: A: 91 % - 100 %, B: 81 % - 90 %, C: 71 % - 80 %, D: 61 % - 70 %, E: 51 % - 60 %, FX: 0 % - 50 %.	
<b>Learning outcomes:</b> Knowledge and skills from the basics of working with standard information and communication technologies, which provide a variety of opportunities to support mathematics education. Skills to use basic commands of turtle geometry for generalization and writing algorithms for construction of geometric shapes. To master the basic principles of creating structures in the environment of dynamic geometry. Acquire creative and evaluative skills to plan and prepare a meaningful integration of modern technologies into mathematics education.	
<b>Brief outline of the course:</b> 1-5: Use of basic algorithmic constructions in turtle geometry for the construction of geometric shapes,	

6th - 7th: Basics of work in the environment of dynamic geometry, creation of dynamic constructions, 8th - 9th: Interactive teaching applications available on the Internet, selected possibilities of using digital technologies in mathematics education. 10. - 12. : Use of numerical and graphical representations of data and modeling in a spreadsheet environment in solving mathematical problems.					
<b>Recommended literature:</b> Brdička, B.: Role internetu ve vzdělávání, 2003, <a href="http://it.pedf.cuni.cz/~bobr/role/econt.htm">http://it.pedf.cuni.cz/~bobr/role/econt.htm</a> . Lukáč, S. a kol.: IKT vo vyučovaní matematiky, Asociácia projektu Inforek 2002. Vaníček, J.: Počítačové kognitivní technologie ve výuce geometrie. Pedagogická fakulta Univerzity Karlovy, 2009. Šťastný, Z.: Matematické a statistické výpočty v Microsoft Excelu, Computer Press 2001.					
<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 136					
A	B	C	D	E	FX
52.21	25.0	16.18	5.15	1.47	0.0
<b>Provides:</b> doc. RNDr. Stanislav Lukáč, PhD.					
<b>Date of last modification:</b> 17.02.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚCHV/ ACHU/21		<b>Course name:</b> Inorganic Chemistry			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 / 1 <b>Per study period:</b> 42 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 5					
<b>Recommended semester/trimester of the course:</b> 2.					
<b>Course level:</b> I.					
<b>Prerequisites:</b> ÚCHV/VCHU/15					
<b>Conditions for course completion:</b> Written test in the middle and the end of the semester followed by the oral examination. Active participation on seminars.					
<b>Learning outcomes:</b> Gaining knowledge about the properties and reactivity of elements and their compounds, the periodicity of their properties and the periodicity of the properties of their compounds. Knowledge of the basic physical and chemical properties of elements and their compounds, reactivity, their preparation, production and occurrence.					
<b>Brief outline of the course:</b> Electronic configuration, abundance, use, physical and chemical properties, preparation, reactivity of non-metallic elements hydrogen, halogens, oxygen, sulphur, nitrogen, phosphorus, carbon, silicon, boron and rare gases. Binary and other compounds formed by these elements, their properties and reactivity. Metals and transition elements. Abundance, properties, reactivity, important compounds.					
<b>Recommended literature:</b> Greenwood, N. N., Earnshaw, A: Chemistry of the Elements. Pergamon Press, Oxford, 1984 Atkins O., Overton T., Rourke J., Weller M., Armstrong F.: Inorganic Chemistry, University Press, Oxford, 2006.					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 90					
A	B	C	D	E	FX
31.11	30.0	24.44	7.78	6.67	0.0
<b>Provides:</b> prof. RNDr. Vladimír Zelenák, DrSc., prof. RNDr. Juraj Černák, DrSc.					
<b>Date of last modification:</b> 07.02.2022					



**Approved:** prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚCHV/ACH2/21	<b>Course name:</b> Inorganic Chemistry II
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 / 2 <b>Per study period:</b> 42 / 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 6	
<b>Recommended semester/trimester of the course:</b> 3., 5.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> ÚCHV/ACH1/10 or ÚCHV/ACHU/21 or ÚCHV/ACHU/03	
<b>Conditions for course completion:</b> 1. Students are required to attend seminars, this also applies to the online form of teaching. The relevant teacher who leads the seminar will justify the absence of the student (illness, family reasons, etc.) in a maximum of two seminars during the semester without the need to replace the teaching hours. In the case of a longer justified absence (for example due to illness), the teacher will assign to the student alternative forms of duties; 2. Activity at seminars. The preparation of students and their activity in seminars is always assessed by the teacher who leads the seminar, within his / her competence. 3. Participation in 10 small written tests within the seminar, for each small test you can get 1 point. In the case of a justified absence of a student from a small test, the teacher may require to elaborate a written job. Successful completion is considered if the student obtains at least 5.5 points from these tests, which is a condition for participation in the exam. The points obtained from the seminar will be included in the total number of points obtained for the subject in the range of 10%. 4. The exam is usually carried out in written form (3 written tests, of which 2 tests during the semester) with the possibility of further oral examination, or, in case of restrictions of contact forms of the teaching, the exam will be performed in a suitable online - electronic form. 5. To successfully complete the course, it is necessary to obtain at least 51% of the maximum number of points in each test and for seminars.	
<b>Learning outcomes:</b> To acquire knowledge about physical and chemical properties of metallic elements and their compounds.	
<b>Brief outline of the course:</b> General characterization of metals, chemistry of elements of the 1st and 2nd group, aluminum and other metals elements of groups 13 to 16. Chemistry of transition elements with emphasis on the 1st transition series. Coordination compounds, chemistry of lanthanides and actinides. In all chapters are discussed the atomic properties of elements, properties of elements as substances, properties of their compounds. Emphasis is also put on environmental aspects of the properties of elements and their compounds. The lectures are discussed at the seminars in detail.	
<b>Recommended literature:</b>	

1. Greenwood, N.N., Earnshaw, A.: Chemistry of the elements, Pergamon Press N.Y., 1984.
2. D.F. Shriver, P.W. Atkins: Inorganic Chemistry, Oxford University Press, Oxford, 4th Ed., 2006.

**Course language:**

**Notes:**

The subject can be realized in the form of personal attendance or, if necessary, also in online form.

**Course assessment**

Total number of assessed students: 54

A	B	C	D	E	FX
12.96	20.37	37.04	20.37	5.56	3.7

**Provides:** prof. RNDr. Juraj Černák, DrSc., prof. RNDr. Vladimír Zelenák, DrSc., RNDr. Miroslava Matiková Mařarová, PhD.

**Date of last modification:** 16.11.2021

**Approved:** prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚCHV/ ANCH1b/21	<b>Course name:</b> Instrumental Analytical Chemistry
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 2 <b>Per study period:</b> 28 / 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 5	
<b>Recommended semester/trimester of the course:</b> 4., 6.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Active participation in seminars; successful completion of the final test. Elaboration of 2 written assignments (or subject project), which will be one of the conditions for participation in the exam. The evaluation of the student's study results within the study of the subject is carried out by a combination of continuous control during the teaching part of the semester (50%) with an examination during the examination period (50%). Note: Detailed conditions are updated annually within the repository for digital support materials (LMS UPJŠ).	
<b>Learning outcomes:</b> The student acquires knowledge of the theoretical foundations and instrumentation in analytical chemistry.	
<b>Brief outline of the course:</b> Classification of instrumental analytical methods. Basic parts of analytical instruments. Comparison of range, accuracy, detection limit, selectivity and economic characteristics of analytical methods. Analytical signal and calibration. Detection limit. Standard addition method. Accuracy and precision. Spectral methods. Electromagnetic radiation. Analytical signal of the optical methods. Classification of spectral and optical analytical methods. Instrumentation of spectral methods. Basic parts of instruments in spectral analysis: optical elements, radiation sources, monochromators, detectors (scheme, principle, basic characteristics, advantages and disadvantages). Molecular spectrometry. Nephelometry and turbidimetry. Luminescence analysis. Infrared spectroscopy. Raman spectroscopy. Refractometry. Chiroptical methods. Mass spectroscopy. Atomic spectral methods. Atomic absorption spectroscopy. Atomic emission spectral analysis. Atomic fluorescence spectrometry. Separation and preconcentration methods. Classification of separation methods. Chromatographic and non-chromatographic separation methods. Basic characteristics of separation methods. Non-chromatographic separation methods. Chromatographic methods of separation. Classification of chromatographic methods. Elution characteristics. Liquid chromatography. Gas chromatography. Supercritical fluid chromatography. Basic parts of instruments in chromatography. Electroanalytical methods. Basic principle of electroanalytical methods and their division. Potentiometry. Polarography. Voltammetry. Electrogravimetry. Coulometry. Conductometry.	
<b>Recommended literature:</b>	

1. Labuda a kol. Analytická chémia. ISBN: 9788022742429, Vydavateľstvo: STU Bratislava, Rok vydania: 2014, Počet strán: 671
2. Christian G.D. Analytical Chemistry. John Wiley & Sons, Inc. New York – Chichester – Brisbane – Toronto – Singapore 1994.
3. Holtzclaw H.F., Jr., Robinson W.R. College Chemistry with Qualitative Analysis. D.C. Heath and Company 1988.

**Course language:**

Slovak

**Notes:**

The course is implemented by full-time or, if necessary, distance method using the MS Teams or BBB or a combined method. The form of teaching is specified by the teacher at the beginning of the semester and updated continuously.

A calculator is required to master the calculation exercises. Not a cell phone!

**Course assessment**

Total number of assessed students: 25

A	B	C	D	E	FX
16.0	40.0	16.0	8.0	20.0	0.0

**Provides:** prof. Mgr. Vasil' Andruch, DSc.

**Date of last modification:** 15.07.2022

**Approved:** prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KPE/IIŠP/21		<b>Course name:</b> Integration and Inclusion in School Practice			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 3.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 114					
A	B	C	D	E	FX
50.0	35.09	8.77	4.39	0.88	0.88
<b>Provides:</b> PaedDr. Michal Novocký, PhD., Mgr. Zuzana Vagaská, PhD.					
<b>Date of last modification:</b> 14.09.2024					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚCHV/ UECH/08	<b>Course name:</b> Introduction to Environmental Chemistry
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 5	
<b>Recommended semester/trimester of the course:</b> 3., 4..	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Continuous test. Active participation in exercises - elaboration of semester work. Passing the final examination in the form of a written test.	
<b>Learning outcomes:</b> Introduction to topics in environmental chemistry and basic procedures applied for environmental protection. Discusses current and future environmental problems and possibilities how to solve them from chemical point of view.	
<b>Brief outline of the course:</b> Introduction to Environmental Chemistry Chemical aspects of pollution and environmental problems. Composition and behavior of the atmosphere. Energy balance of the Earth and climate changes. Principles of photochemistry, photoprocesses in the atmosphere. Petroleum, hydrocarbons and coal (characteristics, sources and environmental pollution). Soaps, polymers and synthetic surfactants. Haloorganics and pesticides. Environmental chemistry of some important elements (C, N, S, P, halogens, biologically important metals ...). Environmental chemistry in aqueous media. Aqueous systems, parameters, cycles and their protection. The Earth's crust (rocks, minerals, soils). Natural and artificial radioactivity, utilization. Energy and energy sources (fossil fuels, nuclear, geothermal, solar energy, wind and water energy). Solid waste disposal and recycling.	
<b>Recommended literature:</b> 1. Gary W. van Loon, Stephen J. Duffy : Environmental Chemistry - A Global Perspective, Oxford University Press, Oxford 2003 2. R.A. Bailey, H.M. Clark, J.P. Ferris, S. Krause, R.L. Strong : Chemistry of the Environment, Academic Press, San Diego 2002 3. G. Schwedt: The Essential Guide to Environmental Chemistry, Wiley and Sons, London 2001 4. R.N. Reeve, J.D. Barnes: General Environmental Chemistry, Wiley, London 1994 5. G. Burton, J. Holman, G. Pilling, D. Waddington: Chemical Storylines, Heinemann, Oxford, London 1994 6. www	
<b>Course language:</b>	

**Notes:**

Based on the current pandemic situation in Slovakia and in accordance with the conditions of the Faculty of Natural Sciences of UPJŠ in Košice, the education and examination can also be carried out in a distance form. The tutorial will be carried out in the form of online lectures and consultings in the BigBlueButton system. The written form of the exam takes place through the Google Forms app. Students prepare responses to the final written test. Test questions are randomly generated each time. The final oral exam is conducted through a webinar in BigBlueButton <https://bbb.science.upjs.sk/b>) system with online generation of random question numbers.

**Course assessment**

Total number of assessed students: 1

abs	n
100.0	0.0

**Provides:** doc. RNDr. Andrea Straková Fedorková, PhD.

**Date of last modification:** 18.07.2022

**Approved:** prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> Dek. PF UPJŠ/USPV/13	<b>Course name:</b> Introduction to Study of Sciences
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> 12s / 3d <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 1.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b>	
<b>Learning outcomes:</b>	
<b>Brief outline of the course:</b>	
<b>Recommended literature:</b>	
<b>Course language:</b>	
<b>Notes:</b>	
<b>Course assessment</b> Total number of assessed students: 2369	
abs	n
90.12	9.88
<b>Provides:</b> doc. RNDr. Marián Kireš, PhD.	
<b>Date of last modification:</b> 30.08.2022	
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.	

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ UAD/10	<b>Course name:</b> Introduction to data analysis
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 1 / 1 <b>Per study period:</b> 14 / 14 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 5.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Test (40p) and individual project work (20p). Oral presentation of the individual project work (5p). At least 50% must be obtained from each part. Final evaluation: $\geq 90\%$ A; $\geq 80\%$ B; $\geq 70\%$ C; $\geq 60\%$ D; $\geq 50\%$ E; $< 50\%$ FX.	
<b>Learning outcomes:</b> To know the basic purpose of statistical data analysis, its methods and statistical thinking and understand its importance for science and practical life. To understand elementary statistical concepts. To gain experience in handling real data using spreadsheet Excel and statistical software R.	
<b>Brief outline of the course:</b> 1. Introduction (the basic philosophy and aim of statistical data analysis, descriptive and inductive statistics) 2. Collecting Data (types of data, random sample, randomized experiment) 3. Handling Data (visualization, summarizing – measures of center, measures of variability, skewness and kurtosis, empirical rule) - 5 weeks 4. Relationships in data (introduction to regression and correlation) - 4 weeks 5. Statistical inference (elementary view into estimation and testing hypothesis) - 2 weeks	
<b>Recommended literature:</b> 1. Rossman, A.J. et al.: Workshop Statistics: Discovery with Data, 4th ed. Wiley, 2011 2. Utts, J.M.: Seeing Through Statistics, 5th ed., Cengage Learning, 2024 3. Utts, J.M., Heckard R.F.: Mind on Statistics, 6th ed.. Cengage Learning, 2021 4. Anděl, J.: Statistické metody, Matfyzpress, 5. vydanie, Praha, 2019 (in Czech)	
<b>Course language:</b> Slovak	
<b>Notes:</b>	

<b>Course assessment</b>					
Total number of assessed students: 520					
A	B	C	D	E	FX
38.08	23.08	23.46	10.96	0.96	3.46
<b>Provides:</b> doc. RNDr. Martina Hančová, PhD., RNDr. Andrej Gajdoš, PhD., Mgr. Patrik Štein					
<b>Date of last modification:</b> 21.11.2024					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ UDM/22	<b>Course name:</b> Introduction to mathematics
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 4 <b>Per study period:</b> 56 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 3	
<b>Recommended semester/trimester of the course:</b> 1.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Two tests during the semester.	
<b>Learning outcomes:</b> Repetition of problematic sections of the secondary mathematics by interesting tasks. Explanation of basic terms, properties and proof methods used in various areas of mathematics.	
<b>Brief outline of the course:</b> Simplification of algebraic expressions. Real number, absolute value of real numbers; equations and inequalities. Irrational equations and inequalities. Concept of function. Linear and quadratic function; equations and inequalities. Exponential and logarithmic function; equations and inequalities. Goniometric functions; equations and inequalities. Complex numbers.	
<b>Recommended literature:</b> 1. V. Medek - L. Mišík - T. Šalát: REPETITÓRIUM STREDOŠKOLSKEJ MATEMATIKY, Alfa Bratislava, 1976 2. S. Richtárová - D. Kyselová: MATEMATIKA (pomôcka pre maturantov a uchádzačov o štúdium na vysokých školách), Enigma Nitra, 1998 3. O. Hudec – Z. Kimáková – E. Švidroňová: PRÍKLADY Z MATEMATIKY (pre uchádzačov o štúdium na TU v Košiciach), EF TU Košice, 1999 4. F. Peller – V. Šáner – J. Eliáš – Ľ. Pinda: MATEMATIKA – Podklady na prijímacie testy pre uchádzačov o štúdium, Ekonóm Bratislava, 2000/2001 5. F. Vesajda – F. Talafous: ZBIERKA ÚLOH Z MATEMATIKY pre stredné všeobecnovzdelávacie školy a gymnáziá, SPN Bratislava, 1973 6. J. Lukášová – O. Odvárko – B. Riečan – J. Šedivý – J. Vyšín: ÚLOHY Z MATEMATIKY pre 4. ročník gymnázia, SPN Bratislava, 1976	
<b>Course language:</b> Slovak	
<b>Notes:</b>	

<b>Course assessment</b>					
Total number of assessed students: 636					
A	B	C	D	E	FX
24.06	19.97	17.77	15.88	9.59	12.74
<b>Provides:</b> RNDr. Igor Fabrici, Dr. rer. nat., Mgr. Daniela Kovalčíková, Mgr. Enikő Schnürerová					
<b>Date of last modification:</b> 29.01.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚMV/ LCO/10		<b>Course name:</b> Linear and integer programming			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 2 <b>Per study period:</b> 28 / 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 5					
<b>Recommended semester/trimester of the course:</b> 5.					
<b>Course level:</b> I.					
<b>Prerequisites:</b> ÚMV/ALGa/10					
<b>Conditions for course completion:</b> Continuous evaluation: a small test during each tutorial, two large tests, a project with real data and commercial software. Bonus points awarded for homeworks (formulation of proofs). A necessary condition for final exam is at least 50% of points from the semester. Final exam: demonstrate the understanding of the theory and ability of argumentation.					
<b>Learning outcomes:</b> Ability to formulate practical tasks in a form of a linear program. Proficiency in solving linear programs by several methods, also using software. Understanding of the underlying theory and ability of exact argumentation.					
<b>Brief outline of the course:</b> Formulation of linear and integer programs. Geometric solution. Simplex method, its correctness and finiteness. Duality and its economic interpretation. Dual and revised simplex method. Sensitivity analysis and parametric programming. Algorithms for integer programming: branch and bound, Gomory cuts. Computational complexity of LP and ILP. Solution of practical problems.					
<b>Recommended literature:</b> lms.upjs.sk - podklady k prednáškam a zadania úloh na cvičenia. Plesník, Dupačová, Vlach: Lineárne programovanie, Alfa, Bratislava 1990 Ch. Papadimitriou – K. Steiglitz: Combinatorial Optimization: Algorithms and Complexity, 1984 R.J. Vanderbei, Linear Programming: Foundations and Extensions, Springer 2020, electronic version: <a href="http://www.princeton.edu/~rvdb/LPbook/">http://www.princeton.edu/~rvdb/LPbook/</a>					
<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 177					
A	B	C	D	E	FX
21.47	18.08	19.21	20.34	18.08	2.82

<b>Provides:</b> prof. RNDr. Katarína Cechlárová, DrSc., Mgr. Juraj Hirjak
<b>Date of last modification:</b> 17.04.2022
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚMV/MAE/10		<b>Course name:</b> Macroeconomics			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b> 5.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> The final mark is given based on the results of the tests written during the semester ("small" written exams every week, two written exams checking the ability of computations). The final oral exam evaluates the ability of argumentation about the studied models. The student has to obtain at least 50% of points in the written exams to have the right to take part in the oral exam.					
<b>Learning outcomes:</b> The student understands the basic macroeconomic models and is able to use them to explain the real economic phenomena.					
<b>Brief outline of the course:</b> Basic macroeconomic notions: Gross domestic product, inflation, unemployment.. Analysis of goods markets. Financial markets. IS-LM model in closed economy. Open economy. IS-LM model in open economy. Models of labour market. Inflation and economic growth. High depth.					
<b>Recommended literature:</b> 1. Olivier Blanchard, Alessia Amighini, Francesco Giavazzi, Macroeconomics, a European perspective, Pearson Education, 2021 2. N. Gregory Mankiw, Macroeconomics, 7th Edition, Harvard University, Worth Publishers 2009					
<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 93					
A	B	C	D	E	FX
29.03	12.9	20.43	18.28	13.98	5.38
<b>Provides:</b> prof. RNDr. Katarína Cechlárová, DrSc.					
<b>Date of last modification:</b> 24.11.2024					



**Approved:** prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ MAN2c/22	<b>Course name:</b> Mathematical analysis III
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 2 <b>Per study period:</b> 28 / 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 5	
<b>Recommended semester/trimester of the course:</b> 3.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> ÚMV/MAN2b/22	
<b>Conditions for course completion:</b> During the term, each student receives marks for two written exams each worth 25 points. Final marking is assigned based on the overall points for the work throughout the term followed by a written and oral examination where the student can obtain further 30+20 points. Marking classification: A:91%-100%, B:81%-90%, C:71%-80%, D:61%-70%, E:51%-60%, FX:0%-50%	
<b>Learning outcomes:</b> Deepening the knowledge of real analysis of function with a single variable. The student will <ol style="list-style-type: none"> <li>1. familiarise themselves with mathematical culture, ways of thinking, self-expression and putting forward arguments,</li> <li>2. gain a deeper understanding of the base terminology of real analysis, their properties and interconnections,</li> <li>3. be able to define and interpret key terms, prove their basic properties and relationships,</li> <li>4. know how to solve tasks focused on utilising the aforementioned concepts and interpret the obtained results.</li> </ol>	
<b>Brief outline of the course:</b> Definite Riemann integral - definition, elementary properties, calculation methods, applications. Improper Riemann integral. Sequences and series of real functions – pointwise and uniform convergence, properties of the limit function and the sum. Power series, Taylor series and their applications.	
<b>Recommended literature:</b> <ol style="list-style-type: none"> <li>1. Mihalíková, B. - Ohriska, J.: Matematická analýza II (skriptum), UPJŠ Košice, 2007.</li> <li>2. Hutník, O.: Určitý integrál (elektronický učebný text), UPJŠ, Košice, 2012.</li> <li>3. Kľuvánek, I. - Mišík, L. - Švec, M.: Matematika I, ALFA, Bratislava, 1971.</li> <li>4. Demidovič, B. P.: Sbírka úloh a cvičení z matematické analýzy, Fragment, Praha, 2003.</li> <li>5. Eliaš, J. - Horváth, J. - Kajan, J.: Zbierka úloh z vyššej matematiky 2, 3, 4, Alfa, Bratislava, 1971.</li> <li>6. Brannan, D.: A First Course in Mathematical Analysis, Cambridge University Press, Cambridge 2006.</li> </ol>	

7. Bruckner, A. M. - Bruckner J. B. - Thomson, B. S.: Real Analysis, Second Edition, ClassicalRealAnalysis.com, 2008.					
8. Zorich, V. A.: Mathematical Analysis I, Springer-Verlag 2002.					
<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 274					
A	B	C	D	E	FX
10.22	15.69	13.87	20.44	33.58	6.2
<b>Provides:</b> prof. RNDr. Ondrej Hutník, PhD., Mgr. Miloslav Cisko					
<b>Date of last modification:</b> 25.04.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ MAN2d/22	<b>Course name:</b> Mathematical analysis IV
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 2 <b>Per study period:</b> 28 / 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 4	
<b>Recommended semester/trimester of the course:</b> 4., 6.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> ÚMV/MAN2b/22	
<b>Conditions for course completion:</b> Continuous assessment is taken the form of two main tests during the semester. Final evaluation is given by continuous assessment (60%), written and oral part of the exam (40%).	
<b>Learning outcomes:</b> The student understands the basic concepts and their properties, which are defined in the content of the course. He has developed skills to use this theory in solving theoretical and practical problems. The student is able to do connections in solving problem tasks.	
<b>Brief outline of the course:</b> 1. Function of several real variables - basic notions, limits and continuity. (3 weeks) 2. Differential calculus of functions of several real variables - partial derivative, differentiability, directional derivative, local and global extrema, constrained local extrema. (5 weeks) 3. Multivariable Riemann integral - definition, calculation methods, applications. (2 weeks) 4. Metric space - Euclidean space, topological properties of points and sets in metric space, completeness (3 weeks)	
<b>Recommended literature:</b> 1. J. Kuben a kol: Diferenciální počet funkcí více proměnných, Brno a Ostrava, 2012. 2. L. Kluvánek, I. Mišík, M. Švec: Matematika I, II, SVTL, Bratislava, 1959. 3. P. Vodstrčil, J. Bouchala: Integrální počet funkcí více proměnných, Ostrava a Plzeň, 2012. 4. Z. Došlá, O. Došlý: Metrické prostory, Teorie a příklady. 3.vydání, 2006. 5. J. Eliaš, J. Horváth, J. Kajan: Zbierka úloh z vyššej matematiky 3, 4, SVTL, Bratislava, 1966. 6. D. Hughes-Hallett et al.: Calculus, Wiley, 1998. 7. B. S. Thomson, J. B. Bruckner, A. M. Bruckner: Elementary real analysis, Prentice Hall (Pearson), Lexington, 2008.	
<b>Course language:</b> Slovak	
<b>Notes:</b>	

<b>Course assessment</b>					
Total number of assessed students: 79					
A	B	C	D	E	FX
25.32	18.99	22.78	13.92	16.46	2.53
<b>Provides:</b> RNDr. Lenka Halčinová, PhD.					
<b>Date of last modification:</b> 17.04.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ MAN2b/22	<b>Course name:</b> Mathematical analysis of function of real variable
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 4 / 3 <b>Per study period:</b> 56 / 42 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 7	
<b>Recommended semester/trimester of the course:</b> 2.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> ÚMV/FRPa/19	
<b>Conditions for course completion:</b> Two written tests during semester and activity student to practice. Final evaluation is given by continuous assessment, written and oral part of the exam.	
<b>Learning outcomes:</b> The purpose of the course is to strengthen the knowledge in differential and integral calculus of real functions of one real variable and to develop computational skills in the field.	
<b>Brief outline of the course:</b> Limit and continuity of real functions, elementary functions. Differential calculus - derivatives of the first and of higher orders, the basic theorems of differential calculus and their use to investigate properties and behavior of functions.	
<b>Recommended literature:</b> 1. Mihalíková, B. - Ohriska, J.: Matematická analýza I (elektronický učebný text), UPJŠ Košice, 2012. 2. Mihalíková, B. - Ohriska, J.: Matematická analýza II (skriptum), ES UPJŠ Košice, 2007. 3. Kluvánek, I. - Mišík, L. - Švec, M.: Matematika I, ALFA, Bratislava, 1971. 4. Demidovič, B. P.: Sbírka úloh a cvičení z matematické analýzy, Fragment, Praha, 2003. 5. Brannan, D.: A First Course in Mathematical Analysis, Cambridge University Press, Cambridge 2006. 6. Bruckner, A. M., Bruckner J. B., Thomson, B. S.: Real Analysis, Second Edition, ClassicalRealAnalysis.com, 2008. 7. Zorich, V. A.: Mathematical Analysis I, Springer-Verlag 2002.	
<b>Course language:</b> Slovak	
<b>Notes:</b>	

<b>Course assessment</b>					
Total number of assessed students: 139					
A	B	C	D	E	FX
13.67	15.83	17.27	20.14	24.46	8.63
<b>Provides:</b> prof. RNDr. Ondrej Hutník, PhD., RNDr. Lenka Halčinová, PhD., RNDr. Jana Borzová, PhD.					
<b>Date of last modification:</b> 17.04.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚMV/ MMD/22		<b>Course name:</b> Mathematical modeling			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 <b>Per study period:</b> 42 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 3					
<b>Recommended semester/trimester of the course:</b> 5.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> Submitting a project from the specified list of projects and, possibly, a related short presentation.					
<b>Learning outcomes:</b> Using concrete examples of problems from real life, students will become familiar with several approaches and strategies for creating a mathematical model of specified problem as well as with defining the conditions related a real problem and transforming them into created mathematical model.					
<b>Brief outline of the course:</b> One specified real-life problem will be discussed, explored and modeled each week.					
<b>Recommended literature:</b> 1. E. Lindner, A. Micheletti, C. Nunes (eds.), Mathematical Modelling in Real Life Problems, Springer, 2020. 2. K.K. Tung, Topics in Mathematical Modeling, Princeton University Press, 2007. 3. H. P. Williams, Model Building in Mathematical Programming, Wiley, 2013.					
<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 41					
A	B	C	D	E	FX
78.05	17.07	4.88	0.0	0.0	0.0
<b>Provides:</b> RNDr. Jana Borzová, PhD., prof. RNDr. Katarína Cechlárová, DrSc., RNDr. Igor Fabrici, Dr. rer. nat., RNDr. Andrej Gajdoš, PhD., RNDr. Lenka Halčinová, PhD., RNDr. Jaroslav Šupina, PhD., doc. RNDr. Martina Hančová, PhD., Mgr. Martin Vodička, Dr. rer. nat., prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Ivan Žezula, CSc., RNDr. Lucia Kőszeggyová, PhD., doc. Mgr. Jozef Kisefák, PhD., doc. RNDr. Daniel Klein, PhD., prof. RNDr. Tomáš Madaras, PhD.					
<b>Date of last modification:</b> 25.08.2022					



**Approved:** prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ MRUa/22	<b>Course name:</b> Mathematical problem solving strategies I
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 4.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Assessment is given on the basis of the results of written examinations carried out during the semester and active participation in exercises. Classification scale: A: 91 % - 100 %, B: 81 % - 90 %, C: 71 % - 80 %, D: 61 % - 70 %, E: 51 % - 60 %, FX: 0 % - 50 %.	
<b>Learning outcomes:</b> The student is able to explain the basic concepts and methods of solving mathematical problems selected from various areas of school mathematics. The student is able to apply the acquired knowledge in finding and using various strategies for solving problems. The student will get acquainted with typical and more demanding tasks in school mathematics and with specific problems and misconceptions that occur in their solution in the teaching of mathematics in primary and secondary school.	
<b>Brief outline of the course:</b> 1. - 7. Solving equations, inequalities and systems of equations (equations and inequalities with absolute values, equations with parameters, irrational equations and inequalities, exponential and logarithmic equations and inequalities, trigonometric equations and inequalities). 8. - 13. Concept of function, properties of elementary functions, graphs of functions.	
<b>Recommended literature:</b> Kubáček, Z., Černek, P., Žabka J. a kol.: Matematika a svet okolo nás, zbierka úloh. FMFI UK Bratislava, 2008 Kopka, J., Hrozny problémů ve školské matematice, Univerzita J. E. Purkyně, Ústí nad Labem, 1999. Učebnice a zbierky úloh z matematiky ZŠ a SŠ.	
<b>Course language:</b> Slovak	
<b>Notes:</b>	

<b>Course assessment</b>					
Total number of assessed students: 254					
A	B	C	D	E	FX
27.95	21.65	22.05	12.2	14.17	1.97
<b>Provides:</b> prof. RNDr. Jozef Doboš, CSc.					
<b>Date of last modification:</b> 25.04.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/MRUB/22	<b>Course name:</b> Mathematical problem solving strategies II
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 6.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Conditions for continuous evaluation: <ol style="list-style-type: none"> <li>1. Participation in teaching in accordance with the study rules and instructions of the teacher.</li> <li>2. Activity.</li> <li>3. Homework and written test.</li> <li>4. Conditions for successful completion of the course:               <ol style="list-style-type: none"> <li>1. Participation in teaching in accordance with the study regulations and according to the instructions of the teacher;</li> <li>2. Credits will be awarded to a student who scores at least 50% on homework assignments and at least 50% on written test. A grade of A requires at least 90%, a grade of B requires at least 80%, a grade of C requires at least 70%, a grade of D requires at least 60%, and a grade of E requires at least 50%.</li> </ol> </li> </ol>	
<b>Learning outcomes:</b> Students demonstrate a shift in different methods of problem-solving from combinatorics, probability and statistics. They will be aware of the connections between different methods of solution, and also the connections of these methods of solution with other topics of school mathematics. While solving problems on written tests, the students will show that they have a conceptual understanding of the concepts of school combinatorics, probability and statistics. They are ready to use several methods of solving problems from these topics, they are able to consider whether a non-standard student's solution is correct or not, and they can explain this solution.	
<b>Brief outline of the course:</b> The content is focuses on different methods of problem-solving in combinatorics, probability and statistics. We are dealing with developing combinatorial, probabilistic and statistical thinking through different methods of problem-solving. The content of the course is based on current research results in this area. In solving combinatorial problems, students are introduced to the components of the model of combinatorial thinking - the listing of possibilities, the counting process, and combinatorial formulas and methods, and the connections between these components. When solving probability problems, we emphasize the different approaches to probability -	

statistical, classical, geometric, and subjective and their connections. In part aimed at statistics, we focus on descriptive statistics and on the connection between probability and statistics.					
<b>Recommended literature:</b> Hecht, T., Sklenáriková, Z., Metódy riešenia matematických úloh, Bratislava, SPN, 1992. (in slovak) Krantz, S.G., Techniques of Problem Solving, AMS, 1997. Larson, L.C., Metódy riešenia matematických problémov, Bratislava, Alfa, 1990. (in slovak) Textbooks for secondary and middle schools.					
<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 139					
A	B	C	D	E	FX
35.25	16.55	24.46	12.23	10.07	1.44
<b>Provides:</b> doc. RNDr. Ingrid Semanišinová, PhD.					
<b>Date of last modification:</b> 17.04.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ MST/19	<b>Course name:</b> Mathematical statistics
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 2 <b>Per study period:</b> 28 / 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 5	
<b>Recommended semester/trimester of the course:</b> 5.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Total evaluation based on two written tests during the semester (2x40p) and the result of the written (30p) and oral part of the exam (30p). At least 50% must be obtained from each part. Final evaluation: $\geq 90\%$ A; $\geq 80\%$ B; $\geq 70\%$ C; $\geq 60\%$ D; $\geq 50\%$ E; $< 50\%$ FX.	
<b>Learning outcomes:</b> Student should obtain the knowledge about basic statistical methods and the ability to apply theoretical knowledge in practical problems solving.	
<b>Brief outline of the course:</b> <ol style="list-style-type: none"> <li>1. Random vectors (definition, distributions, characteristics, joint and marginal distributions).</li> <li>2. Covariance, correlation and regression.</li> <li>3. Random sample, sampling distributions and characteristics.</li> <li>4. Some important statistics and their distributions.</li> <li>5. Point estimators and their properties.</li> <li>6. Maximum likelihood method.</li> <li>7. Interval estimates, confidence interval construction (2 weeks).</li> <li>8. Testing of statistical hypothesis (critical region, level of significance and power of test, methods for searching optimal critical regions).</li> <li>9. Some important parametric tests (2 weeks).</li> <li>10. Some important nonparametric tests (2 weeks).</li> </ol>	
<b>Recommended literature:</b> <ol style="list-style-type: none"> <li>1. Skřivánková V.: Pravdepodobnosť v príkladoch, UPJŠ, Košice, 2006 (in Slovak)</li> <li>2. Skřivánková V.-Hančová M.: Štatistika v príkladoch, UPJŠ, Košice, 2005 (in Slovak)</li> <li>3. Casella, G., Berger, R., Statistical Inference, 2nd ed., Chapman and Hall/CRC, 2024</li> <li>4. DeGroot, M. H., Schervish, M. J.: Probability and Statistics, 4th ed., Pearson, Boston, 2012</li> <li>5. Anděl J.: Základy matematické statistiky, MatfyzPress, Praha, 2011 (in Czech)</li> </ol>	
<b>Course language:</b> Slovak	
<b>Notes:</b>	

<b>Course assessment</b>					
Total number of assessed students: 200					
A	B	C	D	E	FX
25.5	21.0	16.5	18.5	10.5	8.0
<b>Provides:</b> doc. RNDr. Martina Hančová, PhD.					
<b>Date of last modification:</b> 21.11.2024					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚMV/ BMM/25		<b>Course name:</b> Mathematics			
<b>Course type, scope and the method:</b> <b>Course type:</b> <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b>					
<b>Course level:</b> I.					
<b>Prerequisites:</b> ÚMV/MAN2c/22 and ÚMV/ATC/22 and ÚMV/GEO2d/22					
<b>Conditions for course completion:</b> Acquiring the required number of credits in the structure defined by the study plan.					
<b>Learning outcomes:</b> Evaluation of student's competences with respect to the profile of the graduate.					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 0					
A	B	C	D	E	FX
0.0	0.0	0.0	0.0	0.0	0.0
<b>Provides:</b>					
<b>Date of last modification:</b> 21.11.2024					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KPE/MKŠP/21		<b>Course name:</b> Mentoring and Coaching in School Practice			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 5.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 85					
A	B	C	D	E	FX
88.24	9.41	2.35	0.0	0.0	0.0
<b>Provides:</b> Mgr. Zuzana Vagaská, PhD., Mgr. Beáta Sakalová, PhD.					
<b>Date of last modification:</b> 18.09.2024					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚMV/ MIE/13		<b>Course name:</b> Microeconomics			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b> 5.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> Continuous assessment: feedback in MOODLE, small tests during tutorial (notions), two written exams (solving problems). Final oral exam: ability of verbal argumentation and graphical explanation of studied models.					
<b>Learning outcomes:</b> Understanding of basic principles of microeconomics and ability to apply them in practical situations.					
<b>Brief outline of the course:</b> Economics and economy. Supply and demand. Consumer Theory. Theory of firm. Perfect competition. Monopoly. Labour market. Market failure. Externalities and Public goods.					
<b>Recommended literature:</b> 1. lms.upjs.sk: lectures, tutorials and other material 2. H.L. Varian, Intermediate Mikroekonomics, WW Norton, 1993 3. J.M. Perloff, Microeconomics, 6th Edition, Addison Wesley, 2012 4. J. Sloman, Economics, 6th Edition, Prentice Hall, 2006					
<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 90					
A	B	C	D	E	FX
24.44	22.22	18.89	18.89	13.33	2.22
<b>Provides:</b> prof. RNDr. Katarína Cechlárová, DrSc.					
<b>Date of last modification:</b> 24.11.2024					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KPE/MMKV/17		<b>Course name:</b> Multiculturalism and Multicultural Education			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 4.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 251					
A	B	C	D	E	FX
40.64	41.43	16.33	0.8	0.4	0.4
<b>Provides:</b> PaedDr. Michal Novocký, PhD.					
<b>Date of last modification:</b> 12.03.2024					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ NUM/19	<b>Course name:</b> Numerical methods
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 3 <b>Per study period:</b> 28 / 42 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 6	
<b>Recommended semester/trimester of the course:</b> 6.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> (ÚMV/MANb/19 or ÚMV/MAN2b/22 or ÚMV/FRPb/19) and (ÚMV/ALG1b/24 or ÚMV/ALG2b/22 or ÚMV/ALG3b/22 or ÚMV/ALG4b/22)	
<b>Conditions for course completion:</b> Form: Lectures and practices using computers. Solving problems and programming algorithms using the computational platform SageMath (including Python, NumPy, SciPy, SymPy, R, Maxima, matplotlib, GAP, FLINT, and many other packages). Interim assessment (50% of the total assessment): Solving assigned tasks e.g. in the form of implementation of algorithms or their parts, modification of existing codes or use of available packages in solving real problems. Final examination (50% of the total assessment): It consists of verifying the understanding of the theory taken over and demonstrating the practical skills acquired.	
<b>Learning outcomes:</b> After completing the course, the student will acquire theoretical knowledge and practical skills regarding the principles and implementation of basic numerical algorithms with emphasis on algorithms used in the field of data analysis. The student should be able to understand and implement numerical algorithms in programming language independently, to be able to modify components of existing algorithms and also be able to solve (real) problems by selecting an appropriate numerical method with the available effective computational packages.	
<b>Brief outline of the course:</b> 1. Basic principles and techniques of numerical analysis - computer implementation and representation of real numbers, numerical vs. symbolic (analytical) calculations, method vs. algorithm, error measurement of numerical solution, conditionality of numerical problems, stability and convergence of numerical algorithms. 2. Solution of nonlinear equations - methods of bisection and simple iteration, the false position method and Newton method, Newton-Raphson method. 3. Numerical differentiation and integration - trapezoidal method, Simpson method, Newton-Cotes formulas. 4. Approximation of functions and smoothing of data, using polynomials, interpolation, splines, kernel methods.	

5. Linear systems - Gaussian elimination with and without pivoting, forward and backward substitution, scaled partial pivoting, singularity and perturbation, matrix conditionality, Thomas method, iterative methods - Jacobi, Gauss-Seidel, SOR method, gradient methods - gradient descent, conjugate directions.
6. Eigenvalues and eigenvectors of matrices - estimation of eigenvalues, partial eigenvalue problem (power method and Rayleigh method, Hessenberg shape), complete eigenvalue problem (calculation of dominant eigenvalue, LU, QU, QR - decomposition, Jacobi method), SVD - Singular Matrix Decomposition.
7. Optimization - MLS, Cauchy method of the highest gradient, Newton method, conjugated gradient method of Fletcher-Reeves, Quasi-Newton methods, Regularization of ill-conditioned problems.

**Recommended literature:**

1. Ackleh, A. S., Allen, E. J., Kearfott, R. B., & Seshaiyer, P. (2009). Classical and Modern Numerical Analysis: Theory, Methods and Practice (1 edition). Boca Raton: Chapman and Hall/CRC.
2. Anastassiou, G. A., & Mezei, R. (2015). Numerical Analysis Using Sage. Springer International Publishing.
3. Cheney, E. W., & Kincaid, D. R. (2012). Numerical Mathematics and Computing (7 edition). Boston, MA: Cengage Learning.
4. O'Leary, D. P. (2008). Scientific Computing with Case Studies. Philadelphia: Society for Industrial and Applied Mathematics.
5. Sauer, T. (2017). Numerical Analysis. (3 edition). Hoboken, NJ: Pearson.
6. Segethová, J. (2002). Základy numerické matematiky. Karolinum.
7. M. Vicher (2003). Numerická matematika.

**Course language:**

Slovak

**Notes:**

**Course assessment**

Total number of assessed students: 142

A	B	C	D	E	FX
13.38	16.9	8.45	14.79	34.51	11.97

**Provides:** doc. Mgr. Jozef Kiseľák, PhD., RNDr. Andrej Gajdoš, PhD.

**Date of last modification:** 18.04.2022

**Approved:** prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚCHV/OCHU/21	<b>Course name:</b> Organic chemistry
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 / 1 <b>Per study period:</b> 42 / 14 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 5	
<b>Recommended semester/trimester of the course:</b> 2.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> ÚCHV/VCHU/15 or ÚCHV/VCHU/14 or ÚCHV/VCHU/10 or ÚCHV/VACH/10	
<b>Conditions for course completion:</b> Written test. Two tests, in 7th and 14th week. Test max 50 points. A student must obtain at least 51% of points. Writing of the tests is mandatory. Written exam, 100 points. 69 Theoretical questions (69 points), 62 chemical formulas (31 points). A student must obtain at least 51% of points. Final evaluation: A 91-100 pts, B 81-90 pts, C 71-80 pts, D 61-70 pts, E 51-60 pts, FX 0-50 pts.	
<b>Learning outcomes:</b> Basic organic chemistry course. Nomenclature of organic compounds, their chemical properties, structure, reactivity and characteristic reactions. Preparation of organic molecules, explanation of the basic mechanisms and principles of organic reactions. After completing the subject, the student understands the studied theories, principles, methods and logical procedures of organic chemistry. He has knowledge of modern organic chemistry with an emphasis on the current development of knowledge in the aforementioned area.	
<b>Brief outline of the course:</b> Chemical bonding Hybridization and Bonding Covalent bonds Double bonds and Triple Bonds Structural Formulas of Organic Molecules Polar Covalent Bonds and Electronegativity Constitutional Isomers Alkenes Electrophilic Additions Strong Brønsted Acids Lewis Acids (non-Proton Electrophiles) Electrophilic Halogen Reagents Other Electrophilic Reagents Reduction Oxidation Radical Additions Allylic Substitution Alkynes Addition Reactions Hydrogenation Electrophiles Hydration & Tautomerism Hydroboration Nucleophilic Addition & Reduction Acidity of Terminal Alkynes (Substitution of H) Alkyl Halides General Reactivity Substitution (of X) SN2 Mechanism SN1 Mechanism Elimination (of HX) Summary of Substitution vs. Elimination Substitution by Metals Elimination Reactions of Dihalides Alcohols Reactions of Alcohols Substitution of the Hydroxyl H Substitution of the Hydroxyl Group Elimination of Water Oxidation of Alcohols Reactions of Phenols Acidity of Phenols Ring Substitution of Phenols Oxidation to Quinones Aromatic compounds Electrophilic Substitution A Substitution Mechanism Reactions of Substituted Benzenes Reaction Characteristics Reactions of Disubstituted Rings Reactions of Substituent Groups Nucleophilic Substitution, Elimination & Addition Reactions Amines Basicity of Nitrogen Compounds Acidity of Nitrogen Compounds Important Reagent Bases Reactions of	

Amines Electrophilic Substitution at Nitrogen Preparation of 1°-Amines Preparation of 2° & 3°-Amines Reactions with Nitrous Acid Reactions of Aryl Diazonium Intermediates Elimination Reactions of Amines Oxidation States of Nitrogen Basic information: Aldehydes & Ketones Carboxylic Acids Derivatives of Carboxylic acids Natural products					
<b>Recommended literature:</b> 1. Organic chemistry, J. Clayden, N. Greeves Warren, S. Wothers, Oxford University Press, 2012, ISBN 978-0-19-92-7029-3. 2. Organic chemistry, J. E. McMurry, Brooks/Cole, a Thomson Learning Company 2004, Sixth Eddition, ISBN 0534389996. 3. Organic chemistry, P. Zahradník, M. Mečiarová, P. Magdolen, Univerzita Komenského v Bratislave, 2019, ISBN: 978-80-223-4589-7.					
<b>Course language:</b> anglický					
<b>Notes:</b> Teaching is carried out in person or, if necessary, online using the MS Teams tool. The form of teaching is specified by the teacher at the beginning of the semester, updated continuously.					
<b>Course assessment</b> Total number of assessed students: 84					
A	B	C	D	E	FX
11.9	9.52	22.62	41.67	13.1	1.19
<b>Provides:</b> RNDr. Slávka Hamuláková, PhD., univerzitná docentka, doc. RNDr. Miroslava Martinková, PhD., univerzitná profesorka, doc. RNDr. Mária Vilková, PhD.					
<b>Date of last modification:</b> 04.08.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚCHV/ POCHU/15	<b>Course name:</b> Organic chemistry - Lab.
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 4 <b>Per study period:</b> 56 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 4	
<b>Recommended semester/trimester of the course:</b> 3.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> ÚCHV/OCHU/03 or ÚCHV/OCHU/21	
<b>Conditions for course completion:</b> 100% participations in practical exercises. Two written tests 2 x 25 pts (a minimum of 13 points must be obtained in each test), twelve reports 12 x 2 pts, laboratory skills 12 pts, short quizzes and questions 14 pts. A 100 pts. in total. Assessment A: 91-100; B: 81-90; C: 71-80; D: 60-71; E: 51-60; FX: 0-50 pts.	
<b>Learning outcomes:</b> Students will become familiar with the basic isolation and purification methods used in a synthetic laboratory. Students should master basic laboratory technique and be able to apply the theoretical knowledge from the basic course of organic chemistry in simple synthetic projects.	
<b>Brief outline of the course:</b> Preparation, isolation, purification and identification of organic compounds. The emphasis is on gaining the experimental skills in synthesis of organic compounds, distillation, extraction, crystallization, sublimation and thin-layer chromatography. <ol style="list-style-type: none"> <li>1. Isolation and purification methods - crystallization</li> <li>2. Isolation and purification methods - distillation</li> <li>3. Preparation of ethyl acetate</li> <li>4. Preparation of acetylsalicylic acid</li> <li>5. Preparation of benzalaniline</li> <li>6. Spectral methods in organic chemistry</li> <li>7. Preparation of acetophenone oxime</li> <li>8. Preparation of benzilic acid</li> <li>9. Preparation of 4,5-diphenylimidazole</li> <li>10. Isolation of caffeine from tea</li> <li>11. Isolation of trimyristin from nutmeg</li> </ol>	
<b>Recommended literature:</b> <ol style="list-style-type: none"> <li>1. Handout with experimental procedures <a href="http://kekule.science.upjs.sk/pochu">http://kekule.science.upjs.sk/pochu</a>.</li> <li>2. Organic chemistry lectures.</li> </ol>	
<b>Course language:</b>	



Slovak					
<b>Notes:</b>					
<b>Course assessment</b>					
Total number of assessed students: 274					
A	B	C	D	E	FX
55.84	27.37	10.58	5.47	0.73	0.0
<b>Provides:</b> RNDr. Slávka Hamuláková, PhD., univerzitná docentka, RNDr. Ján Elečko, PhD., RNDr. Jana Špaková Raschmanová, PhD., doc. RNDr. Mariana Budovská, PhD., RNDr. Kvetoslava Stanková, PhD., RNDr. Martin Fábian, PhD.					
<b>Date of last modification:</b> 28.01.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚCHV/ OCH1b/21	<b>Course name:</b> Organická chémia II
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 2 <b>Per study period:</b> 28 / 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 5	
<b>Recommended semester/trimester of the course:</b> 3., 5.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Written test. Two tests, in 7th and 14th week. Test max 50 points. A student must obtain at least 51% of points from each test. Writing of the tests is mandatory. Written exam, 100 points. 69 Theoretical questions (69 points), 62 chemical formulas (31 points). A student must obtain at least 51% of points. Final evaluation: A 91-100 pts, B 81-90 pts, C 71-80 pts, D 61-70 pts, E 51-60 pts, FX 0-50 pts.	
<b>Learning outcomes:</b> The advanced organic chemistry. The structure, reactivity and synthesis of organic compounds with careful explanations of difficult concepts and reaction mechanisms. After completing the subject, the student has deeper knowledge of organic chemistry, knows how to connect the properties of organic compounds with their structure and reactivity. He can explain the principles of the mechanisms of organic reactions and propose syntheses of various groups of organic compounds (also multi-stage). The student understands the studied theories, principles, methods and logical procedures of advanced organic chemistry. He has knowledge of modern trends in the field of organic chemistry with an emphasis on the current development of knowledge in the aforementioned field.	
<b>Brief outline of the course:</b> Ethers - their nomenclature, preparation and reactions. Sigmatropic rearrangements, their selectivity. Preparation and reactions of epoxides. Nitrogen compounds, Amines, their nomenclature, basicity and nucleophilicity, preparation amines, their reactions. Diazonium salts, their preparation and reactions. Nitro compounds, their preparation and reactions. Nitroso compounds, oximes, hydrazones, nitroaldol reaction. Carbonyl compounds - aldehydes and ketones, their nomenclature and reactivity. Nucleophilic additions, addition of the primary and secondary amines and related nitrogen reagents, the aldol reaction, self-condensations, cross-condensations and related reactions. Claisen condensation and its variants. Alkylation of enolates and their applications. Benzilic acid rearrangement, Benzoin condensation, Cannizzaro reaction, Mannich reaction, Reformatsky reaction, Perkin synthesis, Knoevenagel condensation, Julia olefination, Julia-Kocienski and Petersen olefination, Wittig reaction, HWE olefination, Baylis-Hillman reaction, Darzens reaction, Baeyer-Villiger oxidation, conjugate addition, Michael addition (Michael's donors and acceptors), Robinson annulation.	

Carboxylic acids, their nomenclature, properties and preparation. Reactions of carboxylic acids, Esterification. Carboxylic acid derivatives (acyl halides, anhydrides, esters, amides, – their nomenclature, properties, preparation and reactions).  $\beta$ -Oxoesters – their preparation and reactions. Acyloin condensation, Arndt-Eistert synthesis, Hofmann degradation, Lossen degradation, Curtius rearrangement, Wolff rearrangement.

Amino acids – their stereochemistry, properties, preparation and reactions, peptide bond - its structure, synthesis of peptides, the protective groups for amino acids.

Saccharides - classification, their nomenclature and stereochemistry. Fischer and Haworth projection, conformation of saccharides, reaction of saccharides (oxidation, reduction, production of the glycosidic bond). The protective groups. Oligosaccharides, polysaccharides.

Nucleotides and nucleic acids (structure of nucleoside, saccharides in NA, purine and pyrimidine bases in NA). Examples of nucleotides in RNA and DNA.

Heterocyclic compounds. Five and six membered heterocyclic compounds.

Terpenes, steroids and alkaloids - their classification and properties.

### Recommended literature:

Recommended literature:

1. J. Clayden, N. Greeves, S. Warren, P. Wothers: Organic Chemistry, Oxford University Press, 2012.
2. Solomons T.W. Graham: Solomon's Organic Chemistry, Wiley&Sons Inc., 2017.
3. J. E. McMurry: Organic Chemistry, Vysoké učení technické v Brně, 2007, VUTIUM, ISBN: 978-80-214-3291-8 (VUT v Brně).
4. J. E. McMurry: Organic Chemistry, Cengage, 2015.

### Course language:

english

### Notes:

Teaching is carried out in person or, if necessary, online, using the MS Teams tool. The form of teaching is specified by the teacher at the beginning of the semester, updated continuously.

### Course assessment

Total number of assessed students: 45

A	B	C	D	E	FX
15.56	13.33	17.78	22.22	26.67	4.44

**Provides:** doc. RNDr. Miroslava Martinková, PhD., univerzitná profesorka

**Date of last modification:** 04.08.2022

**Approved:** prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KPE/ Pg/15		<b>Course name:</b> Pedagogy			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 3.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 1331					
A	B	C	D	E	FX
21.79	30.65	23.44	13.45	8.41	2.25
<b>Provides:</b> PaedDr. Michal Novocký, PhD., doc. PaedDr. Renáta Orosová, PhD.					
<b>Date of last modification:</b> 14.09.2024					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚCHV/ FCHU/22		<b>Course name:</b> Physical Chemistry			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 / 2 <b>Per study period:</b> 42 / 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 6					
<b>Recommended semester/trimester of the course:</b> 4.					
<b>Course level:</b> I.					
<b>Prerequisites:</b> ÚCHV/VCHU/14 or ÚCHV/VCHU/10 or ÚCHV/VACH/10 or ÚCHV/VCHU/15					
<b>Conditions for course completion:</b> Active participation in seminars. Two partial tests from computational seminars, each must be mastered at A-E. In the case of distance learning, it is necessary to prepare 2 assignments, each must be mastered at 80%. Examination, understanding of three thematic areas of the subject (thermodynamics, electrochemistry, kinetics), must be mastered at A-E.					
<b>Learning outcomes:</b> Acquirement of the basics knowledgements of physical chemistry within the chapters: thermodynamics, phase equilibria, chemical equilibria, electrochemistry, chemical kinetics.					
<b>Brief outline of the course:</b> Fundamental concepts of thermodynamics, thermochemistry, chemical equilibrium, phase equilibria and diagrams, laws for ideal gas and reals gases, liquids, solutions, solutions of electrolytes. Electrochemistry: ionics and electrodics. Electrodes and electrochemical cells, corrosion. Chemical kinetics, catalysis. Adsorption.					
<b>Recommended literature:</b> T. Engel, P. Reid: Physical Chemistry, Pearson Educat. Inc., San Francisco 2006 P.W. Atkins: Physical Chemistry, Oxford University Presss, Oxford 1986, 1990, 1996 W.J. Moore: Physical Chemistry, Longman, London 1972 and newer editions					
<b>Course language:</b>					
<b>Notes:</b> Teaching is carried out in person. If a distance form is required, the lectures will take place online, using the BigBlueButton ( <a href="https://bbb.science.upjs.sk/">https://bbb.science.upjs.sk/</a> ). Other conditions will be specified by the teacher.					
<b>Course assessment</b> Total number of assessed students: 43					
A	B	C	D	E	FX
30.23	11.63	20.93	18.6	11.63	6.98

<b>Provides:</b> prof. RNDr. Renáta Oriňaková, DrSc., RNDr. Ivana Šišoláková, PhD., univerzitná docentka, RNDr. Radka Gorejová, PhD., RNDr. Jana Shepa, PhD.
<b>Date of last modification:</b> 22.07.2022
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚCHV/ FCH1b/10	<b>Course name:</b> Physical Chemistry II
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 / 2 <b>Per study period:</b> 42 / 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 6	
<b>Recommended semester/trimester of the course:</b> 4., 6.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> ÚCHV/FCH1a/03 or ÚCHV/FCH1a/21 or ÚCHV/FCHU/10	
<b>Conditions for course completion:</b> 1. Participation in seminars (also applies to the online form of teaching). Students are required to attend seminars. The relevant teacher who leads the seminar will justify the reasoned absence of the student (incapacity for work, family reasons, etc.) in a maximum of two seminars during the semester without the need for replacement. In the event of a longer-term reasoned absence (for example due to incapacity for work), the relevant teacher will provide the student with an alternative form of mastering the missed material. 2. Activity at seminars. The preparation of students and their regular monitoring is always assessed by the relevant teacher who conducts the seminar, within his/her competence. 3. Two tests from computational exercises, usually in the 6th and 12th week of the semester. To successfully pass each test, it is necessary to obtain at least 8 points (out of 15 points). Successful completion of continuous tests is a condition of admission to the oral exam. 4. The exam is observed in a regular oral form, resp. in case of restrictions of contact forms of the pedagogical process, the exam is performed by a suitable distance - electronic form. 5. To successfully master the subject, it is necessary to prove mastery of the required curriculum at least 51%.	
<b>Learning outcomes:</b> Students will gain knowledge about the principles that govern the speed of chemical processes, the kinetics and mechanism of some selected reactions, the balance and kinetics of electrode processes. They will also learn the basics of electrochemistry and catalysis.	
<b>Brief outline of the course:</b> Electrochemistry. Equilibrium homogeneous processes in electrolyte solutions. Charge transfer in electrolyte solutions. Nonequilibrium homogeneous processes. Transport processes in electrolyte solutions. Conductance and molar conductivity. Hindering effects. Transport numbers. Equilibrium in heterogeneous electrochemical systems. Processes on charged interfaces. Electrochemical cells and fuel cells. Classification of electrode types. Concentration cells. Electrolysis. Electrochemical power sources. Potentiometry. Electrical double layer. Surface tension. Chemical kinetics. Homogeneous processes. Reaction rate. Reaction order. Classification of chemical reactions. Elementary chemical reactions. Mechanism and kinetics equations of complicated chemical processes. Methods of rate law determination. Theory of chemical kinetics.	

<p>Temperature dependence of reaction rates. Collision theory. Activated complex theory. Chain reactions. Structure and rate laws of chain reactions. Explosion. Polymerisation reactions. Photochemical reactions. Catalysis. Theory of homogeneous catalysis. Chemical oscillation reactions. Heterogeneous processes. Diffusion. Physical and chemical adsorption. Adsorption and diffusion. Processes in heterogeneous electrochemical systems. Electrode kinetics, activation and diffusive mechanism of charge transfer.</p> <p>Application of theoretical relationships on the solving of concrete problems and on the calculation of examples during seminars.</p>																	
<p><b>Recommended literature:</b></p> <p>T. Engel, P. Reid : Physical Chemistry, Pearson Educat. Inc., San Francisco 2006</p> <p>P.W. Atkins : Physical Chemistry, Oxford University Press, Oxford 1986, 1990, 1994, 1998</p> <p>W.J. Moore : Physical Chemistry, Longman, London 1972 and newer editions</p>																	
<p><b>Course language:</b></p> <p>Slovak language</p>																	
<p><b>Notes:</b></p> <p>Teaching is carried out in person or, if necessary, remotely using the bbb or MS Teams tool. The form of teaching is specified by the teacher at the beginning of the semester, updated continuously.</p>																	
<p><b>Course assessment</b></p> <p>Total number of assessed students: 623</p> <table border="1"> <thead> <tr> <th>A</th><th>B</th><th>C</th><th>D</th><th>E</th><th>FX</th></tr> </thead> <tbody> <tr> <td>15.41</td><td>18.62</td><td>22.47</td><td>18.46</td><td>21.35</td><td>3.69</td></tr> </tbody> </table>						A	B	C	D	E	FX	15.41	18.62	22.47	18.46	21.35	3.69
A	B	C	D	E	FX												
15.41	18.62	22.47	18.46	21.35	3.69												
<p><b>Provides:</b> prof. RNDr. Renáta Oriňáková, DrSc., RNDr. Jana Shepa, PhD., RNDr. Radka Gorejová, PhD., RNDr. Viktória Čákyová, Mgr. Mária Paračková</p>																	
<p><b>Date of last modification:</b> 25.11.2021</p>																	
<p><b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.</p>																	



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ FPCh/21	<b>Course name:</b> Physics for Chemists
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 2 <b>Per study period:</b> 28 / 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 5	
<b>Recommended semester/trimester of the course:</b> 1.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Two written examinations during the semester, where students apply the new knowledge by solving problems. Oral exam where students present theoretical knowledge of the thematic areas listed in the syllabus.	
<b>Learning outcomes:</b> Completing the course students will get knowledge of fundamental physical laws and will understand their relation to chemistry.	
<b>Brief outline of the course:</b> <ol style="list-style-type: none"> <li>1. Kinematics of a point mass.               <ul style="list-style-type: none"> <li>- Average and instantaneous velocity, 1D and 3D.</li> <li>- Acceleration of a point mass (free fall, angled shot).</li> <li>- Steady movement on a circle.</li> </ul> </li> <li>2. Dynamics of a mass point I.               <ul style="list-style-type: none"> <li>- Newton's laws, applications. Different types of forces. Friction.</li> </ul> </li> <li>3. Dynamics of a mass point II.               <ul style="list-style-type: none"> <li>- Mechanical work.</li> <li>- Kinetic energy.</li> <li>- Conservative force field, potential energy (gravitational, springs).</li> <li>- The law of conservation of mechanical energy.</li> <li>- The power.</li> </ul> </li> <li>4. System of mass points and rigid bodies I.               <ul style="list-style-type: none"> <li>- Center of gravity. 1st impulse theorem.</li> <li>- The law of momentum conservation.</li> </ul> </li> <li>5. System of mass points and rigid bodies II.               <ul style="list-style-type: none"> <li>- Rotary motion. Angular momentum, moment of inertia. 2nd impulse theorem.</li> <li>- The law of angular momentum conservation. Kinetic energy of rotational motion of rigid bodies.</li> <li>- Balance.</li> </ul> </li> <li>6. Fluid mechanics I.               <ul style="list-style-type: none"> <li>- Ideal fluid. Density and pressure.</li> <li>- Hydrostatics, pressure measurement. Pascal's law. Archimedes' law.</li> </ul> </li> </ol>	

7. Fluid mechanics II. - Fluid dynamics. - Continuity equation. - Bernoulli equation, applications. 8. Molecular physics and thermodynamics I. - Molecular structure of substances (osmosis, Brownian motion). - Amount of substances, molar mass, Avogadro's law. - Internal energy. Temperature and its measurement (Celsius, Kelvin). - Heat, heat capacity. Latent heat. 9. Molecular physics and thermodynamics II. - Ideal gas: state equation, internal energy, speed distribution. - I. law of thermodynamics. Isothermal, adiabatic and cyclic processes. - Heat transfer: conduction, convection, radiation. - II. law of thermodynamics. Entropy. - Heat engines, Carnot cycle. 10. Electricity and magnetism I. - Electric charge. Coulomb's law. Electric field intensity and potential (voltage). - Capacitor, capacity. - Electric current. Ohm's law. Electrical power. Kirchhoff's laws. 11. Electricity and magnetism II. - Magnetism. Magnetic induction, Lorentz force. Ampere's force. Biot-Savart law. - Faraday's law of electromagnetic induction. Lenz's law. 12. Modern physics - Relativity. Introduction to quantum physics. - Atomic physics. Nuclear physics, applications. Elementary particles and cosmology.					
<b>Recommended literature:</b> 1. V. Hajko, J. Daniel-Szabó: Základy fyziky. Veda, Bratislava, 1980. 2. Š. Veis, J. Maďar, V. Martišovič: Všeobecná fyzika 1, Mechanika a molekulová fyzika. Alfa, Bratislava, 1978. 3. P. Čičmanec: Všeobecná fyzika 2, Elektrina a magnetizmus. Alfa, Bratislava, 1980. 4. R.P. Feynman, R.B. Leighton, M. Sands: Feynmanove prednášky z fyziky 1-5. Alfa, Bratislava, 1985. 5. V. Hajko a kol.: Fyzika v príkladoch. Alfa, Bratislava, 1983.					
<b>Course language:</b> Slovak language.					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 244					
A	B	C	D	E	FX
25.41	21.31	23.36	15.98	13.93	0.0
<b>Provides:</b> doc. Mgr. Gregor Bánó, PhD., RNDr. Zuzana Jurašková, PhD., Mgr. Andrej Hovan, PhD.					
<b>Date of last modification:</b> 22.09.2021					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice							
<b>Faculty:</b> Faculty of Science							
<b>Course ID:</b> ÚCHV/ ADP/03		<b>Course name:</b> Porous materials and their applications					
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present							
<b>Number of ECTS credits:</b> 5							
<b>Recommended semester/trimester of the course:</b> 6.							
<b>Course level:</b> I., II., III.							
<b>Prerequisites:</b>							
<b>Conditions for course completion:</b> Written test in the middle and the end of the semester.							
<b>Learning outcomes:</b> To make the acquaintance of various types of advanced porous solids and basic methods for their investigation. To get up the students with the methods used in characterisation of specific surface area and pore size of different types of porous materials.							
<b>Brief outline of the course:</b> Terminology and principal terms associated with powders, porous solids and adsorption. Methodology of adsorption at the gas-solid interface, liquid-solid interface. Assessment of surface area and porosity. Inorganic materials (active carbon, metal oxides, zeolites, clay minerals, new advanced materials) and phenomenon of adsorption. Application in the industry and everyday life.							
<b>Recommended literature:</b> 1. F. Rouquerol, J. Rouquerol, K. Sing: Adsorption by powders and porous solids, Academic press, London, UK, 1999 2. S. J. Gregg, K.S.W. Sing: Adsorption, surface area and porosity, Academic Press, London,, UK, 1982. 3. V. Zelenák: Adsorption and porosity of solid substances, internal study text, PF UPJŠ, 2020.							
<b>Course language:</b>							
<b>Notes:</b> The course is standardly realized in full-time form, in case of necessary circumstances by distance.							
<b>Course assessment</b> Total number of assessed students: 104							
A	B	C	D	E	FX	N	P
77.88	9.62	3.85	0.0	0.0	0.0	0.0	8.65
<b>Provides:</b> prof. RNDr. Vladimír Zelenák, DrSc.							
<b>Date of last modification:</b> 21.11.2021							

**Approved:** prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> KPPaPZ/PP/15	<b>Course name:</b> Positive Psychology
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week: 2 Per study period: 28</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 4., 6.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Assessment of Study Results: The evaluation of study results for the course is conducted through continuous assessment. Active participation in seminars (a maximum of 2 absences is allowed) accounts for 20%; a presentation during the exercises on a pre-assigned date accounts for 30%; and the preparation and submission of a group year-long methodological guide on Positive Psychology accounts for 50%. Final Grading Scale: A: 100 – 90% B: 89 – 80% C: 79 – 70% D: 69 – 60% E: 59 – 50% FX: 49% or less – failed and must revise the assignment where a low score was obtained. academic information system of the UPJŠ.	
<b>Learning outcomes:</b> Knowledge: Students will gain basic knowledge about the origins, foundations, and applications of Positive Psychology as a new and dynamically developing field of psychology. They will become familiar with research in this area and various perspectives on personal well-being, happiness, and life meaning. They will acquire an overview of the main theoretical approaches in Positive Psychology and their application in the context of individuals and society, with an emphasis on their use in educational settings. Skills: Students will develop the ability to independently and critically address current topics in Positive Psychology, such as positive emotions, interpersonal relationships, hope, optimism, gratitude, and wisdom. They will learn to apply Positive Psychology principles in designing programs aimed at promoting personal well-being and developing positive traits, which can be utilized in working with children and youth in school environments. Competencies: After completing the course, students will be able to effectively apply the principles of Positive Psychology in educational contexts, such as fostering positive interpersonal relationships and developing optimism and gratitude in students. They will be prepared to	

participate in the creation and implementation of programs focused on personal development and mental well-being, contributing to the creation of a positive and supportive school environment.

**Brief outline of the course:**

1. Different perspectives on well-being nad happiness in psychology
2. Main theoretical approaches to positive psychology
3. Positive emotions and positivity
4. Meaningfulness
5. Positive interpersonal relations
6. Post-traumatic growth
7. Hope and optimism
8. Gratitude
9. Spirituality as a personality dimension
10. Wisdom
11. Positive institutions
12. New themes and topics in PP

**Recommended literature:**

Brewer, M. B., & Hewstone, M. (2004). Emotion and motivation. Blackwell.  
Deci, E., & Ryan, R. M. (2002). Handbook of self-determination research. Rochester.  
Křivohlavý, J. (2003). Pozitivní psychologie. Praha: Portál.  
Křivohlavý, J. (2007). Psychologie vděčnosti a nevďčnosti. Praha: Grada.  
Křivohlavý, J. (2012). Psychologie moudrosti a dobrého života. Praha: Grada.  
Křivohlavý, J. (2013). Psychologie pocitu štěstí. Praha: Grada.  
McAdams, D. P. (2002). The person. New York.  
Seligman, M. E. P., & Csikszentmihalyi, M. (Eds.). (2000). Positive psychology [Special issue]. American Psychologist, 55(1).  
Říčan, P. (2007). Psychologie náboženství a spirituality. Praha: Portál.  
Slezáčková, A. (2012). Průvodce pozitivní psychologií. Praha: Grada.  
Carr, A. (2022). Positive psychology: The science of wellbeing and human strengths (3rd ed.). Routledge.

**Course language:**

**Notes:**

**Course assessment**

Total number of assessed students: 462

A	B	C	D	E	FX
98.27	1.3	0.22	0.0	0.22	0.0

**Provides:** doc. Mgr. Gabriel Baník, PhD.

**Date of last modification:** 04.02.2025

**Approved:** prof. RNDr. Ondřej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚCHV/PACHU/03		<b>Course name:</b> Practical from Inorganic Chemistry			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 4 <b>Per study period:</b> 56 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b> 2.					
<b>Course level:</b> I.					
<b>Prerequisites:</b> ÚCHV/VCHU/14 or ÚCHV/VCHU/15 or ÚCHV/VCHU/10 or ÚCHV/VACH/10					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b> Acquisition of practical skills and knowledge necessary for work in a chemical laboratory in the preparation of inorganic and other compounds, in the preparation of solutions, methods of distillation and other basic techniques of work in the laboratory. Students will also be able to perform basic characterization of substances and proof reactions.					
<b>Brief outline of the course:</b> The utilization of common laboratory techniques for preparation of elements (H <sub>2</sub> , O <sub>2</sub> , Cu, Ni), oxides(CO <sub>2</sub> , Al <sub>2</sub> O <sub>3</sub> ·xH <sub>2</sub> O), nitrides(Mg <sub>3</sub> N <sub>2</sub> ), acids (HNO <sub>3</sub> , H <sub>3</sub> BO <sub>3</sub> ), salts((NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub> , KMnO <sub>4</sub> ), binary salts(NH <sub>4</sub> )Fe(SO <sub>4</sub> ) <sub>2</sub> ·12H <sub>2</sub> O), halides (CuCl, CuCl <sub>2</sub> ·2H <sub>2</sub> O, CuBr <sub>2</sub> ) and coordination compounds [Cu(NH <sub>3</sub> ) <sub>4</sub> ]SO <sub>4</sub> ·H <sub>2</sub> O, K <sub>3</sub> [Al(C <sub>2</sub> O <sub>4</sub> ) <sub>3</sub> ]·3H <sub>2</sub> O).					
<b>Recommended literature:</b> J. Černák, J. Bubanec, M. Dzurillová, V. Zeleňák: Praktikum z anorganickej chémie. UPJŠ Košice, 1999. Z. Vargová, J. Kuchár: Základné praktikum z anorganickej chémie, UPJŠ, Košice, 2009. Z.Vargova, M.Almáši, J. Kuchár, J.Dinajová: Základné laboratórne cvičenia z anorganickej chémie, ŠafárikPress, 2020.					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 661					
A	B	C	D	E	FX
54.16	27.08	13.77	2.57	1.66	0.76
<b>Provides:</b> doc. RNDr. Juraj Kuchár, PhD., RNDr. Martin Vavra, PhD., RNDr. Miroslava Matiková Maľarová, PhD., prof. RNDr. Zuzana Vargová, Ph.D.					
<b>Date of last modification:</b> 22.07.2022					

**Approved:** prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚCHV/ PFCU/22	<b>Course name:</b> Practical in Physical Chemistry
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 4 <b>Per study period:</b> 56 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 4	
<b>Recommended semester/trimester of the course:</b> 5.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> ÚCHV/FCHU/21 or ÚCHV/FCHU/22 or ÚCHV/FCHU/10	
<b>Conditions for course completion:</b> 1. Adequate theoretical preparation for individual tasks of experimental practice according to the recommended literature. 2. Passing tasks with relevant results. 3. Processing of experimental work results in the form of a protocols and its acceptance. 4. Assessment of theoretical knowledges and practical skills. <p> In the case of distance learning: 1. Elaboration of a paper on a selected topic and its presentation. 2. Theoretical preparation in the form of protocols, where the basic principles of individual tasks are stated. 3. Teaching is realized in blocks without limiting the scope in the alternative term.	
<b>Learning outcomes:</b> Theoretical principles, description of each technique and appropriate physical chemistry experiments.	
<b>Brief outline of the course:</b> Experimental verification of theoretical knowledge on thermodynamics, thermochemistry, chemical equilibria (determination of enthalpy, phase diagrams), colligative properties (cryoscopy, ebullioscopy), adsorption. Experimental verification of theoretical knowledge on electrochemistry (conductivity, dissociation constants, activity coefficients, electromotive force of galvanic cell, Daniell cell, potentials, polarography) and chemical kinetics (determination of rate constants).	
<b>Recommended literature:</b> B.P. Levitt: Findlay's Practical Physical Chemistry, Longman, London 1973 W.J. Moore: Physical Chemistry, Longman, London 1972 P.W. Atkins: Physical Chemistry, Oxford University Press, Oxford, New York 2002	
<b>Course language:</b>	
<b>Notes:</b>	

Teaching is carried out in person. If a distance form is required, the conditions will be specified by the teacher.

**Course assessment**

Total number of assessed students: 67

A	B	C	D	E	FX
98.51	1.49	0.0	0.0	0.0	0.0

**Provides:** RNDr. František Kaňavský, RNDr. Jana Shepa, PhD.

**Date of last modification:** 22.07.2022

**Approved:** prof. RNDr. Ondřej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ TPP2/22	<b>Course name:</b> Probability theory
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 2 <b>Per study period:</b> 28 / 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 4	
<b>Recommended semester/trimester of the course:</b> 6.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> ÚMV/MAN2c/22	
<b>Conditions for course completion:</b> To obtain at least 50% in two written tests during the semester. Total evaluation based on written tests and oral exam.	
<b>Learning outcomes:</b> To obtain knowledge of the axiomatic theory of probability, random variables and their characteristics, special types of distributions and their applications.	
<b>Brief outline of the course:</b> Probability space, definitions and properties of probability. Conditional probability and independence. Random variables, their distribution function and characteristics. Mean, variance and skewness. Discrete and absolutely continuous distributions. Quantile and characteristic functions, their properties. Relation between characteristic function and moments. Median and mode. Transformation of random variables. Special types of distributions with applications (binomial, Poisson, geometric, uniform, exponential, normal, chi-square, Student, Fisher). Central limit theorem.	
<b>Recommended literature:</b> 1. Skřivánková V.: Pravdepodobnosť v príkladoch, UPJŠ, Košice, 2006 (in Slovak) 2. DeGroot, M. H., Schervish, M. J.: Probability and Statistics, 4th ed., Pearson, Boston, 2012 3. Evans, M. J., Rosenthal, J. S.: Probability and Statistics: The Science of Uncertainty, 2nd Ed., W. H. Freeman, 2009 4. Riečan et al.: Pravdepodobnosť a matematická štatistika, Alfa, Bratislava, 1984 (in Slovak) 5. Potocký a kol.: Zbierka úloh z pravdepodobnosti a matematickej štatistiky, Alfa, Bratislava, 1991	
<b>Course language:</b> Slovak	
<b>Notes:</b>	

<b>Course assessment</b>					
Total number of assessed students: 138					
A	B	C	D	E	FX
26.81	15.22	11.59	10.87	35.51	0.0
<b>Provides:</b> doc. RNDr. Daniel Klein, PhD., RNDr. Andrej Gajdoš, PhD.					
<b>Date of last modification:</b> 17.02.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚINF/ PAZ1a/15	<b>Course name:</b> Programming, algorithms, and complexity
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 / 4 <b>Per study period:</b> 42 / 56 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 8	
<b>Recommended semester/trimester of the course:</b> 3., 5.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Graded activities during semester: assignments, small exams, midterm, final project. Final examination: practical finalterm focused on a complex task. Rules to pass the subject: Pass the minimal limit of points for category of homeworks (assignments, final project) and tests (small exams, midterm). Get at least 42% from the finalterm and pass the defined limit of total points for all graded activities.	
<b>Learning outcomes:</b> Get an ability to implement basic Java programs and obtain essential knowledge related to object-oriented programming.	
<b>Brief outline of the course:</b> <ol style="list-style-type: none"> <li>1. Introduction to Java and JPAZ2 framework, first Eclipse project, interactive communication with objects using turtle graphics, repeating code in loops, notion of class, object, and method.</li> <li>2. For-loops, local variables, variable types, arithmetic expressions, random numbers, random walk, conditions.</li> <li>3. While-loop, returning a value from a method, reference and reference variables, debugging.</li> <li>4. Primitive and reference types, chars, String objects (including basic algorithms), mouse events, instance variables.</li> <li>5. Array of primitive values and array of references, simple array algorithms.</li> <li>6. Advanced array algorithms, two-dimensional array.</li> <li>7. Exceptions and exception handling, files and directories, writing to text files.</li> <li>8. Reading from text files.</li> <li>9. Creating classes, encapsulation, getters and setters, constructors and their hierarchy, method overloading.</li> <li>10. Inheritance and polymorphism.</li> <li>11. Java Collections Framework, ArrayList class, wrapper classes for primitive types and autoboxing, interfaces List, Set, Map and their implementations, methods equals and hashCode.</li> <li>12. Access modifiers, abstract classes and methods, creating and implementing interfaces, sorting, static methods and variables.</li> <li>13. Creating and throwing exceptions, checked and runtime exceptions, JavaDoc, Maven.</li> </ol>	
<b>Recommended literature:</b>	

1. ECKEL, Bruce. Thinking in Java. Fourth edition. Upper Saddle River, NJ: Prentice Hall, c[2006]. ISBN 978-01-318-7248-6.
2. PECINOVSKÝ, Rudolf. OOP: naučte se myslet a programovat objektově. Brno: Computer Press, 2010. ISBN 978-80-251-2126-9.
3. SIERRA, Kathy a Bert BATES. Head first Java. Vyd. 2. Sebastopol: O'Reilly, 2005. ISBN 978-05-960-0920-5.

**Course language:**

Slovak language, english language is required only to read Java API documentation.

**Notes:**

**Course assessment**

Total number of assessed students: 961

A	B	C	D	E	FX
16.86	8.64	12.28	18.73	13.94	29.55

**Provides:** RNDr. Juraj Šebej, PhD., RNDr. Miroslav Opiela, PhD., RNDr. Viktor Pristaš, RNDr. Richard Staňa, Mgr. Viktor Olejár, Mgr. Dominika Kotlárová, doc. RNDr. Ľubomír Šnajder, PhD.

**Date of last modification:** 04.01.2022

**Approved:** prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KPPaPZ/Ps/15		<b>Course name:</b> Psychology			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture <b>Recommended course-load (hours):</b> <b>Per week: 2 Per study period: 28</b> <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 3.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 978					
A	B	C	D	E	FX
40.49	22.39	14.52	11.04	10.02	1.53
<b>Provides:</b> doc. Mgr. Mária Bačíková, PhD., Mgr. Ondrej Kalina, PhD.					
<b>Date of last modification:</b> 04.02.2025					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> KPPaPZ/PKŽ/15	<b>Course name:</b> Psychology of Everyday Life
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 3., 5.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> The evaluation of the course and its subsequent completion will be based on clearly and objectively set requirements, which will be set in advance and will not change. The aim of the assessment is to ensure an objective and fair mapping of the student's knowledge while adhering to all ethical and moral standards. There is no tolerance for students' fraudulent behavior, whether in the teaching process or in the assessment process. 1. Active participation in seminars 2. Elaboration and presentation of PPT presentation on the assigned topic. Maximum number of points 20; minimum number of points 11. 3. Elaboration of an essay in the range of 4xA4 (standard pages). Maximum number of points 20; minimum number of points 11. The final evaluation (grade) is the sum of points for the presentation and the essay. A 40b - 37b B 36b - 33b C 32b - 29b D 28b - 25b E 24b - 21b FX 20b - 0b	
<b>Learning outcomes:</b> The student is able to demonstrate an understanding of the individual's behavior in selected everyday situations such as conflict, group influence, empathy, helping, aggression, etc. The student is able to describe, explain and evaluate the psychological mechanisms that occur in everyday situations. The student is able to apply basic psychological knowledge to himself (self-regulation) but also in interaction with others (cooperation). The method of teaching the subject will be oriented to the student. Speakers will be interested in the needs, expectations and opinions of students so as to encourage them to think critically by expressing respect and feedback on their opinions and needs. The content of the curriculum will be based on primary and high-quality sources that will reflect the topicality of the topics so as to ensure the connection of the curriculum with other subjects and also	



the connection of the curriculum with practice. Students will be expected to take an active approach in lectures and seminars with an emphasis on their independence and responsibility.					
<b>Brief outline of the course:</b> How to understand human behavior (overview of basic approaches in psychology); Basic overview of cognitive processes; Learning processes and their use in practice; Social influences, prosocial and antisocial behavior; How human emotions and motivations work; Deciding - why and when we take risks; Childhood experiences and their relationship to adulthood; Abnormal behavior, mental disorders and therapeutic approaches					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 253					
A	B	C	D	E	FX
46.25	23.32	24.51	4.35	1.19	0.4
<b>Provides:</b> Mgr. Ondrej Kalina, PhD.					
<b>Date of last modification:</b> 10.02.2025					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KPE/ OLŠ/15		<b>Course name:</b> School Administration and Legislation			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 3., 5.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 355					
A	B	C	D	E	FX
45.92	31.27	13.24	5.92	3.1	0.56
<b>Provides:</b> PaedDr. Michal Novocký, PhD., Mgr. Beáta Sakalová, PhD.					
<b>Date of last modification:</b> 14.09.2024					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KF/VKFV/07		<b>Course name:</b> Selected Topics in Philosophy of Education (General Introduction)			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 3., 5.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 52					
A	B	C	D	E	FX
63.46	17.31	17.31	1.92	0.0	0.0
<b>Provides:</b> PhDr. Dušan Hruška, PhD.					
<b>Date of last modification:</b> 13.04.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ VEM/22	<b>Course name:</b> Selected topics in elementary mathematics
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 1 / 1 <b>Per study period:</b> 14 / 14 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 5.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> ÚMV/MAN2c/22	
<b>Conditions for course completion:</b> During the term, each student receives marks for two written exams. Final marking is assigned based on the overall points for the work throughout the term, for homework and their presentation. Marking classification: A:91%-100%, B:81%-90%, C:71%-80%, D:61%-70%, E:51%-60%, FX:0%-50%	
<b>Learning outcomes:</b> Obtain knowledge about the structure of elementary mathematics with respect to advanced mathematics; the development of mathematical skills of prospective teachers. The student will <ol style="list-style-type: none"> <li>1. familiarise themselves with mathematical culture, ways of thinking, self-expression and putting forward arguments,</li> <li>2. gain a deeper understanding of the base terminology of real analysis, their properties and interconnections,</li> <li>3. be able to define and interpret key terms, prove their basic properties and relationships,</li> <li>4. know how to solve tasks focused on utilising the aforementioned concepts and interpret the obtained results.</li> </ol>	
<b>Brief outline of the course:</b> Theory of Equations and Inequalities, Solving Higher Order Polynomials, The Role of CAS systems in Solving Equations and Inequalities, Building the Real Number System, Rational and Irrational Numbers, Farey Sequences, Review of Geometric Series: Preparation for Decimal Representation, Decimal Expansion, Decimal Periodicity, Building the Complex Numbers, Operating on the Complex Numbers, Picturing Complex Numbers and Connections to Transformation Geometry, The Polar Form of Complex Numbers and De Moivre's Theorem, Some Connections to Roots of Polynomials, Euler's Identity and the Irrationality of $e$ , Functions and Modeling, Ways of Representing Functions, Solutions of Cubic Equations Using Trigonometry	
<b>Recommended literature:</b> J. Doboš: Rovnice a nerovnice, Bolchazy-Carducci Publ., 2003. W.W. Esty: The language of mathematics, Montana State University, 2007. F. Klein: Elementary Mathematics from an Advanced Standpoint, Dower Publications, 1945.	

F. Kuřina, Z. Půlpán: Podivuhodný svět elementární matematiky, Academia, Praha, 2006.  
P. Vrábel: Heuristika a metodológia matematiky, Nitra, 2005.

**Course language:**

Slovak

**Notes:**

**Course assessment**

Total number of assessed students: 58

A	B	C	D	E	FX
6.9	27.59	13.79	24.14	27.59	0.0

**Provides:** prof. RNDr. Jozef Doboš, CSc.

**Date of last modification:** 25.04.2022

**Approved:** prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> KPPaPZ/SELFM/25	<b>Course name:</b> Self-Marketing
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 4	
<b>Recommended semester/trimester of the course:</b> 4., 6.	
<b>Course level:</b> I., P	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> The conditions for passing the subject are as follows: 1. Active participation in exercises. Max. the missed range is 90 min. 2. Submission of the reflection on the selected topic within the specified time. Reflection topic: will be given in the exercise. The evaluation of the subject and its subsequent completion will be based on clearly and objectively determined requirements, which will be determined in advance and will not change. The aim of the evaluation is to ensure an objective and fair mapping of the student's knowledge while observing all ethical and moral standards. There is no tolerance for fraudulent student behavior in either the teaching or assessment process.	
<b>Learning outcomes:</b> The student is able to understand and explain the basic assumptions of good self-marketing, knows the possibilities for the correct presentation of his own person and understands the related knowledge and principles of personal and communication area. He / she can understand his / her competencies, his / her goals, how to make his / her strengths visible and he / she can apply this knowledge and social and professional skills in the personal and professional sphere of his / her life, which will also improve his / her employment opportunities.	
<b>Brief outline of the course:</b> What is marketing? (Marketing - Mix) Basics of self-marketing (Personal opinion is crucial, Goal setting, Proper use of opportunity) Me and my influence (What can I offer? What does he / she have unlike me? How do others see me? Ability to defend one's own opinion, Think positively!, I know how to explore myself - what options do I have?), Competence (Have your own opinion, How to withstand criticism, Be a team player, Competence at work), Draw attention to yourself (Voice and word selection, Active in meetings, Present yourself successfully).	
<b>Recommended literature:</b> VÝROST, Jozef - SLAMĚNÍK, Ivan. Sociální psychologie. 2., přepr. a rozš. vyd. Praha : GRADA, 2008. 408 s.	

VÝROST, Jozef - SLAMĚNÍK, Ivan. Aplikovaná sociální psychologie I : Člověk a sociální instituce. 1. vyd. Praha : Portál, 1998. 384 s. ISBN 80-7178-269-6.  
 KOMÁRKOVÁ, Růžena - SLAMĚNÍK, Ivan - VÝROST, Jozef. Aplikovaná sociální psychologie III : Sociálněpsychologický výcvik. 1. vyd. Praha : Grada Publishing, 2001. 224 s.  
 VÝROST, Jozef - SLAMĚNÍK, Ivan. Aplikovaná sociální psychologie II. 1. vyd. Praha : Grada Publishing, 2001. 260 s.

**Course language:**

slovak

**Notes:**

After passing the certification exams from all 4 modules (Teamwork, Selfmarketing, Conflict Management, Communication) the student will receive an ECo-C card and an ECo-C certificate.

**Course assessment**

Total number of assessed students: 0

A	B	C	D	E	FX
0.0	0.0	0.0	0.0	0.0	0.0

**Provides:** Mgr. Ondrej Kalina, PhD., Mgr. Lenka Hudáková, PhD.

**Date of last modification:** 04.02.2025

**Approved:** prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ SMK/17	<b>Course name:</b> Seminar to mathematical clubs
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week: 2 Per study period: 28</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 6.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Conditions for continuous evaluation: <ol style="list-style-type: none"> <li>1. Participation in teaching in accordance with the study rules and instructions of the teacher.</li> <li>2. Activity.</li> <li>3. Homework and written tests.</li> <li>4. Seminar work and its presentation at the seminar - plan the selected topic for one math circle</li> </ol> Conditions for successful completion of the course: <ol style="list-style-type: none"> <li>1. Participation in teaching in accordance with the study regulations and according to the instructions of the teacher;</li> <li>2. Credits will be awarded to a student who scores at least 50% on homework assignments, at least 50% on written tests, and at least 50% on a seminar work. A grade of A requires at least 90%, a grade of B requires at least 80%, a grade of C requires at least 70%, a grade of D requires at least 60%, and a grade of E requires at least 50%.</li> </ol>	
<b>Learning outcomes:</b> While solving homework, the student will become familiar with different types of problems from mathematical competitions and demonstrate the ability to solve them with the mathematical apparatus of the student for whom the problem is intended. While solving problems in written tests, the student will gain proficiency in solving problems from mathematical competitions such as Pythagorean and Mathematical Kangaroo. The student will demonstrate in the seminar work that he/she can prepare the content of a mathematics circle that are motivating for his/her students.	
<b>Brief outline of the course:</b> The content is focuses on solving problems from mathematical competitions, and on familiarization with activities that will be motivating and fun for pupils and will develop their mathematical thinking Students will also learn about the structure of mathematical competitions for middle and high school students and will be theoretically prepared for guiding mathematics circle. The seminars focus on the following topics: Number theory. Equations, inequalities, inequalities.	



Word problems. Planimetry. Stereometry. Combinatorics. Dirichlet principle. Combinatorial geometry. Probability. Mathematical games.					
<b>Recommended literature:</b> Acheson, D.: 1089 a další parádní čísla, Dokořán, 2006. (in czech) Brožury z edície Škola mladých matematikov. (in slovak) Séria brožúr: XY. ročník matematickej olympiády. (in slovak) Ziegler, G.M.: Matematika Vám to spočítá, Universum, Praha, 2011. (in czech) Zhouf, J. a kol.: Matematické příběhy z korespondenčních seminářů, Prometheus, Praha, 2006. (in czech)					
<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 149					
A	B	C	D	E	FX
57.05	21.48	11.41	6.71	3.36	0.0
<b>Provides:</b> doc. RNDr. Ingrid Semanišinová, PhD.					
<b>Date of last modification:</b> 18.04.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚCHV/ ASM/03	<b>Course name:</b> Separation Methods
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 5	
<b>Recommended semester/trimester of the course:</b> 6.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> (ÚCHV/ANCHU/03 or ÚCHV/ANCHU/21 or ÚCHV/ANCHE/09 or ÚCHV/ANCH1b/03 or ÚCHV/ANCH1b/21) and (ÚCHV/PAEC/03 or ÚCHV/PANCH/06 or ÚCHV/PANCHE/09 or ÚCHV/PACU/03)	
<b>Conditions for course completion:</b> 1. Preparation and presentation of a project focused on the application of separation methods. 2. Examination. The exam consists of 3 questions (each of 33%), 50% must be obtained for the pass exam.	
<b>Learning outcomes:</b> Survey of basic principles, theoretical background and applications of separation methods in research and analytical practice.	
<b>Brief outline of the course:</b> Basic principles, classification, theory and applications of separation methods. Extraction - LLE, SPE, SPME. Chromatographic methods - theory, classification. Gas chromatography, stationary phases. Instrumentation, detectors in GC. Data evaluation - qualitative and quantitative analysis. High-performance liquid chromatography, principles, classification. Stationary and mobile phases in LC, instrumentation. Applications. Planar chromatographic methods - TLC, HPTLC, PC. Electrophoretic techniques and their applications.	
<b>Recommended literature:</b> Skoog D. A., Leary J. J.: Principles of instrumental analysis. Saunders College Publishing, New York 1997. Pawliszyn J., Lord H. L.: Handbook of sample preparation, Wiley 2010. Current scientific literature	
<b>Course language:</b> Slovak, english language	
<b>Notes:</b>	

<b>Course assessment</b>					
Total number of assessed students: 506					
A	B	C	D	E	FX
28.66	26.09	25.1	12.65	5.34	2.17
<b>Provides:</b> doc. RNDr. Taťána Gondová, CSc.					
<b>Date of last modification:</b> 01.08.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> KPO/ SPKVV/15	<b>Course name:</b> Social and Political Context of Education
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 4., 6.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Evaluation of the developed assignment. A ... 100,00% - 91,00% B ... 90,99% - 81,00% C ... 80,99% - 71,00% D ... 70,99% - 61,00% E ... 60,99% - 51,00% FX ... 50,99% and less	
<b>Learning outcomes:</b> The aim and purpose of teaching the subject is to impart knowledge and promote reflection on the issues of education and training in the context of social and political change. Development of knowledge: the student will be able to know the current theoretical background related to the process of education and training in a modern democratic society. The student will be able to navigate the social and political space - politically, legally, socially and culturally. He/she will be able to look for alternatives and solutions to dysfunctions, while at the same time exploiting opportunities and ways to implement them.	
<b>Brief outline of the course:</b> The status, role and functions of education in human life and society. The political, social and economic objectives of education. Education, learning and social change in the context of globalisation. Macrosocial determinants of education. Current roles of education and training in modern performance and democratic society.	
<b>Recommended literature:</b> Domestic and foreign journal literature Kudláčová, B.(2007) Človek a výchova v dejinách európskeho myslenia. Trnava: PdF TU Zeus Leonardo (2010) Handbook of Cultural Politics and Education. Rotterdam, The Netherlands.	
<b>Course language:</b> Slovak	
<b>Notes:</b>	

<b>Course assessment</b>					
Total number of assessed students: 201					
A	B	C	D	E	FX
60.7	20.9	10.95	4.48	1.49	1.49
<b>Provides:</b> Mgr. Ján Ruman, PhD.					
<b>Date of last modification:</b> 13.04.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚTVŠ/ TVa/11	<b>Course name:</b> Sports Activities I.
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 1.	
<b>Course level:</b> I., II., P	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Min. 80% of active participation in classes.	
<b>Learning outcomes:</b> Sports activities in all their forms prepare university students for their professional and personal life. They have a great impact on physical fitness and performance. Specialization in sports activities enables students to strengthen their relationship towards the selected sport in which they also improve.	
<b>Brief outline of the course:</b> Brief outline of the course: The Institute of physical education and sport at the Pavol Jozef Šafárik University offers 20 sports activities aerobics; aikido, basketball, badminton, body-balance, body form, bouldering, floorball, yoga, power yoga, pilates, swimming, fitness, indoor football, SM system, step aerobics, table tennis, chess, volleyball, tabata, cycling. Additionally, the Institute of physical education and sport at the Pavol Jozef Šafárik University offers winter courses (ski course, survival) and summer courses (aerobics by the sea, rafting on the Tisza River) with an attractive programme, sports competitions with national and international participation.	
<b>Recommended literature:</b> BENCE, M. et al. 2005. Plávanie. Banská Bystrica: FHV UMB. 198s. ISBN 80-8083-140-8. [online] Dostupné na: <a href="https://www.ff.umb.sk/app/cmsFile.php?disposition=a&amp;ID=571">https://www.ff.umb.sk/app/cmsFile.php?disposition=a&amp;ID=571</a> BUZKOVÁ, K. 2006. Fitness jóga, harmonické cvičení těla I duše. Praha: Grada. ISBN 8024715252. JARKOVSKÁ, H, JARKOVSKÁ, M. 2005. Posilování s vlastním tělem 417 krát jinak. Praha: Grada. ISBN 9788024757308. KAČÁNI, L. 2002. Futbal:Tréning hrou. Bratislava: Peter Mačura – PEEM. 278s. ISBN 8089197027. KRESTA, J. 2009. Futsal.Praha: Grada Publishing, a.s. 112s. ISBN 9788024725345. LAWRENCE, G. 2019. Power jóga nejen pro sportovce. Brno: CPress. ISBN 9788026427902. SNER, Wolfgang. 2004. Posilování ve fitness. České Budějovice: Kopp. ISBN 8072322141.	

STACKEOVÁ, D. 2014. Fitness programy z pohledu kinantropologie. Praha: Galén. ISBN 9788074921155.  
 VOMÁČKO, S. BOŠTÍKOVÁ, S. 2003. Lezení na umělých stěnách. Praha: Grada. 129s. ISBN 8024721743.

**Course language:**

Slovak language

**Notes:**

**Course assessment**

Total number of assessed students: 15781

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
85.74	0.06	0.0	0.0	0.0	0.04	9.0	5.15

**Provides:** Mgr. Patrik Berta, Mgr. Agata Dorota Horbacz, PhD., Mgr. Dávid Kaško, PhD., Mgr. Ladislav Kručanica, PhD., Mgr. Richard Melichar, Mgr. Petra Tomková, PhD., Mgr. Marcel Čurgali, Mgr. Alena Buková, PhD., univerzitná docentka, doc. PaedDr. Ivan Uher, MPH, PhD., prof. RNDr. Stanislav Vokál, DrSc., Mgr. Zuzana Küchelová, PhD., Mgr. Ferdinand Salonna, PhD.

**Date of last modification:** 07.02.2024

**Approved:** prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚTVŠ/ TVb/11	<b>Course name:</b> Sports Activities II.
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 2.	
<b>Course level:</b> I., II., P	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> active participation in classes - min. 80%.	
<b>Learning outcomes:</b> Sports activities in all their forms prepare university students for their professional and personal life. They have a great impact on physical fitness and performance. Specialization in sports activities enables students to strengthen their relationship towards the selected sport in which they also improve.	
<b>Brief outline of the course:</b> Brief outline of the course: The Institute of physical education and sport at the Pavol Jozef Šafárik University offers 20 sports activities aerobics; aikido, basketball, badminton, body-balance, body form, bouldering, floorball, yoga, power yoga, pilates, swimming, fitness, indoor football, SM system, step aerobics, table tennis, chess, volleyball, tabata, cycling. Additionally, the Institute of physical education and sport at the Pavol Jozef Šafárik University offers winter courses (ski course, survival) and summer courses (aerobics by the sea, rafting on the Tisza River) with an attractive programme, sports competitions with national and international participation.	
<b>Recommended literature:</b> BENEC, M. et al. 2005. Plávanie. Banská Bystrica: FHV UMB. 198s. ISBN 80-8083-140-8. [online] Dostupné na: <a href="https://www.ff.umb.sk/app/cmsFile.php?disposition=a&amp;ID=571">https://www.ff.umb.sk/app/cmsFile.php?disposition=a&amp;ID=571</a> BUZKOVÁ, K. 2006. Fitness jóga, harmonické cvičení těla I duše. Praha: Grada. ISBN 8024715252. JARKOVSKÁ, H, JARKOVSKÁ, M. 2005. Posilování s vlastním tělem 417 krát jinak. Praha: Grada. ISBN 9788024757308. KAČÁNI, L. 2002. Futbal:Tréning hrou. Bratislava: Peter Mačura – PEEM. 278s. ISBN 8089197027. KRESTA, J. 2009. Futsal.Praha: Grada Publishing, a.s. 112s. ISBN 9788024725345. LAWRENCE, G. 2019. Power jóga nejen pro sportovce. Brno: CPress. ISBN 9788026427902. SNER, Wolfgang. 2004. Posilování ve fitness. České Budějovice: Kopp. ISBN 8072322141.	



STACKEOVÁ, D. 2014. Fitness programy z pohledu kinantropologie. Praha: Galén. ISBN 9788074921155.  
 VOMÁČKO, S. BOŠTÍKOVÁ, S. 2003. Lezení na umělých stěnách. Praha: Grada. 129s. ISBN 8024721743.

**Course language:**

Slovak language

**Notes:**

**Course assessment**

Total number of assessed students: 13802

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
83.85	0.49	0.01	0.0	0.0	0.04	11.17	4.43

**Provides:** Mgr. Agata Dorota Horbacz, PhD., Mgr. Dávid Kaško, PhD., Mgr. Marcel Čurgali, Mgr. Patrik Berta, Mgr. Ladislav Kručanica, PhD., Mgr. Richard Melichar, Mgr. Petra Tomková, PhD., Mgr. Alena Buková, PhD., univerzitná docentka, doc. PaedDr. Ivan Uher, MPH, PhD., prof. RNDr. Stanislav Vokál, DrSc., Mgr. Zuzana Küchelová, PhD., Mgr. Ferdinand Salonna, PhD.

**Date of last modification:** 07.02.2024

**Approved:** prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚTVŠ/ TVc/11	<b>Course name:</b> Sports Activities III.
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 3.	
<b>Course level:</b> I., II.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> min. 80% of active participation in classes	
<b>Learning outcomes:</b> Sports activities in all their forms prepare university students for their professional and personal life. They have a great impact on physical fitness and performance. Specialization in sports activities enables students to strengthen their relationship towards the selected sport in which they also improve.	
<b>Brief outline of the course:</b> Brief outline of the course: The Institute of physical education and sport at the Pavol Jozef Šafárik University offers 20 sports activities aerobics; aikido, basketball, badminton, body-balance, body form, bouldering, floorball, yoga, power yoga, pilates, swimming, fitness, indoor football, SM system, step aerobics, table tennis, chess, volleyball, tabata, cycling. Additionally, the Institute of physical education and sport at the Pavol Jozef Šafárik University offers winter courses (ski course, survival) and summer courses (aerobics by the sea, rafting on the Tisza River) with an attractive programme, sports competitions with national and international participation.	
<b>Recommended literature:</b> BENCE, M. et al. 2005. Plávanie. Banská Bystrica: FHV UMB. 198s. ISBN 80-8083-140-8. [online] Dostupné na: <a href="https://www.ff.umb.sk/app/cmsFile.php?disposition=a&amp;ID=571">https://www.ff.umb.sk/app/cmsFile.php?disposition=a&amp;ID=571</a> BUZKOVÁ, K. 2006. Fitness jóga, harmonické cvičení těla I duše. Praha: Grada. ISBN 8024715252. JARKOVSKÁ, H, JARKOVSKÁ, M. 2005. Posilování s vlastním tělem 417 krát jinak. Praha: Grada. ISBN 9788024757308. KAČÁNI, L. 2002. Futbal:Tréning hrou. Bratislava: Peter Mačura – PEEM. 278s. ISBN 8089197027. KRESTA, J. 2009. Futsal.Praha: Grada Publishing, a.s. 112s. ISBN 9788024725345. LAWRENCE, G. 2019. Power jóga nejen pro sportovce. Brno: CPress. ISBN 9788026427902. SNER, Wolfgang. 2004. Posilování ve fitness. České Budějovice: Kopp. ISBN 8072322141.	

STACKEOVÁ, D. 2014. Fitness programy z pohledu kinantropologie. Praha: Galén. ISBN 9788074921155.  
 VOMÁČKO, S. BOŠTÍKOVÁ, S. 2003. Lezení na umělých stěnách. Praha: Grada. 129s. ISBN 8024721743.

**Course language:**

Slovak language

**Notes:**

**Course assessment**

Total number of assessed students: 9334

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
87.96	0.06	0.01	0.0	0.0	0.02	4.92	7.03

**Provides:** Mgr. Marcel Čurgali, Mgr. Agata Dorota Horbacz, PhD., Mgr. Dávid Kaško, PhD., Mgr. Patrik Berta, Mgr. Ladislav Kručanica, PhD., Mgr. Richard Melichar, Mgr. Petra Tomková, PhD., Mgr. Alena Buková, PhD., univerzitná docentka, doc. PaedDr. Ivan Uher, MPH, PhD., prof. RNDr. Stanislav Vokál, DrSc., Mgr. Zuzana Küchelová, PhD., Mgr. Ferdinand Salonna, PhD.

**Date of last modification:** 07.02.2024

**Approved:** prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚTVŠ/ TVd/11	<b>Course name:</b> Sports Activities IV.
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week: 2 Per study period: 28</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 4.	
<b>Course level:</b> I., II.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> min. 80% of active participation in classes	
<b>Learning outcomes:</b> Sports activities in all their forms prepare university students for their professional and personal life. They have a great impact on physical fitness and performance. Specialization in sports activities enables students to strengthen their relationship towards the selected sport in which they also improve.	
<b>Brief outline of the course:</b> Brief outline of the course: The Institute of physical education and sport at the Pavol Jozef Šafárik University offers 20 sports activities aerobics; aikido, basketball, badminton, body-balance, body form, bouldering, floorball, yoga, power yoga, pilates, swimming, fitness, indoor football, SM system, step aerobics, table tennis, chess, volleyball, tabata, cycling. Additionally, the Institute of physical education and sport at the Pavol Jozef Šafárik University offers winter courses (ski course, survival) and summer courses (aerobics by the sea, rafting on the Tisza River) with an attractive programme, sports competitions with national and international participation.	
<b>Recommended literature:</b> BENCE, M. et al. 2005. Plávanie. Banská Bystrica: FHV UMB. 198s. ISBN 80-8083-140-8. [online] Dostupné na: <a href="https://www.ff.umb.sk/app/cmsFile.php?disposition=a&amp;ID=571">https://www.ff.umb.sk/app/cmsFile.php?disposition=a&amp;ID=571</a> BUZKOVÁ, K. 2006. Fitness jóga, harmonické cvičení těla I duše. Praha: Grada. ISBN 8024715252. JARKOVSKÁ, H, JARKOVSKÁ, M. 2005. Posilování s vlastním tělem 417 krát jinak. Praha: Grada. ISBN 9788024757308. KAČÁNI, L. 2002. Futbal:Tréning hrou. Bratislava: Peter Mačura – PEEM. 278s. ISBN 8089197027. KRESTA, J. 2009. Futsal.Praha: Grada Publishing, a.s. 112s. ISBN 9788024725345. LAWRENCE, G. 2019. Power jóga nejen pro sportovce. Brno: CPress. ISBN 9788026427902. SNER, Wolfgang. 2004. Posilování ve fitness. České Budějovice: Kopp. ISBN 8072322141.	

STACKEOVÁ, D. 2014. Fitness programy z pohledu kinantropologie. Praha: Galén. ISBN 9788074921155.  
 VOMÁČKO, S. BOŠTÍKOVÁ, S. 2003. Lezení na umělých stěnách. Praha: Grada. 129s. ISBN 8024721743.

**Course language:**  
 Slovak language

**Notes:**

**Course assessment**

Total number of assessed students: 5846

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
82.54	0.27	0.03	0.0	0.0	0.0	8.24	8.91

**Provides:** Mgr. Marcel Čurgali, Mgr. Agata Dorota Horbacz, PhD., Mgr. Dávid Kaško, PhD., Mgr. Patrik Berta, Mgr. Ladislav Kručanica, PhD., Mgr. Richard Melichar, Mgr. Petra Tomková, PhD., Mgr. Alena Buková, PhD., univerzitná docentka, doc. PaedDr. Ivan Uher, MPH, PhD., prof. RNDr. Stanislav Vokál, DrSc., Mgr. Zuzana Küchelová, PhD., Mgr. Ferdinand Salonna, PhD.

**Date of last modification:** 07.02.2024

**Approved:** prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚCHV/MUSU/22	<b>Course name:</b> Structure determination - spectroscopic methods
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 3 <b>Per study period:</b> 28 / 42 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 5	
<b>Recommended semester/trimester of the course:</b> 6.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> (ÚCHV/ACHU/21 or ÚCHV/ACHU/03) and (ÚCHV/ANCHU/21 or ÚCHV/ANCHU/03) and (ÚCHV/OCHU/21 or ÚCHV/OCHU/03)	
<b>Conditions for course completion:</b> 1. Participation in exercises in accordance with the Study Rules of PF UPJŠ. 2. Successful execution of 3 control written works on exercises after 4., 8. and 12. weeks of teaching. Obtaining a minimum grade E from seminars. The test consists of: 1. Solution of 2 structures of unknown compounds on the basis of combined application of spectral methods. 2. Theoretical and practical questions. Percentage rating: 100-91% (A), 90-81% (B), 80-71% (C), 70-61% (D), 60-51% (E), 50% and less FX.	
<b>Learning outcomes:</b> Fundamentals of molecular spectroscopy and magnetic properties study, as powerful tools for structure determination in chemistry. Ultraviolet, visible, infrared and Raman spectroscopy, mass spectrometry and methods based on magnetic resonance ( <sup>1</sup> H NMR, <sup>13</sup> C NMR).	
<b>Brief outline of the course:</b> Fundamentals of molecular spectroscopy, mass spectrometry and magnetic methods as powerful tools for structure determination in chemistry. Ultraviolet and visible spectroscopy. Emission spectroscopy. Symmetry and group theory. Infrared and Raman spectroscopy. Mass spectrometry in organic and analytical chemistry and biochemistry. Nuclear magnetic resonance - NMR. Chemical shift and splitting of signals by spin-spin coupling. Coupling constants. <sup>1</sup> H NMR, <sup>13</sup> C NMR, NMR of other nuclei. Two- and more dimensional NMR. NMR applications. Methods and instruments used for spectra measurements. Combined application of spectral methods for solution of chemical problems.	
<b>Recommended literature:</b> 1. Kováč Š., Ilavský D., Leško J.: Spektrálne metódy v organickej chémii a technológii, ALFA, Bratislava, 1987. 2. Milata V., Segľa P.: Vybrané metódy molekulovej spektroskopie. STU BA, 2007. 3. Milata V., Segľa P.: Spektrálne metódy v chémii. STU FCHPT Bratislava 2002. 4. Miertuš S. a kol.: Atómová a molekulová spektroskopia, ALFA, Bratislava 1991. 5. T. D. W. Claridge: High-Resolution NMR Techniques in Organic Chemistry, 5. Ed., Elsevier, 2016.	

<b>Course language:</b> slovak, english					
<b>Notes:</b> In-person course, alternatively online course using the BigBlueButton tool or MS Teams. The form of teaching is specified by the teacher at the beginning of the semester, updated continuously.					
<b>Course assessment</b> Total number of assessed students: 47					
A	B	C	D	E	FX
36.17	36.17	14.89	10.64	2.13	0.0
<b>Provides:</b> doc. RNDr. Ján Imrich, CSc., doc. RNDr. Juraj Kuchár, PhD., RNDr. Zuzana Kudličková, PhD., RNDr. Monika Tvrdoňová, PhD.					
<b>Date of last modification:</b> 16.08.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚCHV/ SVKB/04	<b>Course name:</b> Students Scientific Conference
<b>Course type, scope and the method:</b> <b>Course type:</b> <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 4	
<b>Recommended semester/trimester of the course:</b>	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Present the results of student's work at the Student Scientific Conference and answer questions from committee members and others present.	
<b>Learning outcomes:</b> The student will acquire competences for independent scientific work in the laboratory, for analysis and written processing of obtained results and knowledge. By presenting the obtained results, the student prepares to present the obtained results in the defense of the bachelor's thesis and in front of the professional public at scientific conferences.	
<b>Brief outline of the course:</b>	
<b>Recommended literature:</b>	
<b>Course language:</b>	
<b>Notes:</b>	
<b>Course assessment</b> Total number of assessed students: 12	
abs	n
100.0	0.0
<b>Provides:</b>	
<b>Date of last modification:</b> 22.07.2022	
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.	



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚMV/ SVK/10		<b>Course name:</b> Students scientific conference			
<b>Course type, scope and the method:</b> <b>Course type:</b> <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b>					
<b>Course level:</b> I., II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b> Individual scientific work of students. Publishing of obtained results in a written form and as a public presentation.					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b> With respect to the research problematics (article in journals, books).					
<b>Course language:</b> Slovak or English					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 101					
A	B	C	D	E	FX
99.01	0.99	0.0	0.0	0.0	0.0
<b>Provides:</b>					
<b>Date of last modification:</b> 01.12.2021					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ DGS/21	<b>Course name:</b> Students' Digital Literacy
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 1.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Summary evaluation based on ongoing assessment: 1. Practical ongoing assignments and their defense (at least 50% needed) 3. Active participation during face-to-face contact learning in classical or virtual classroom (3 absences allowed) and during online learning (no absence, uploading all individual ongoing assignments)	
<b>Learning outcomes:</b> The student should obtain and know to apply basic knowledge and skills in working with current digital technologies (mobile phone, tablet, laptop, web technologies): 1. according to the current European framework for the Digital competence DigComp and ECDL 2. for better and more effective learning, work and active life in higher education, later lifelong learning and further career prospects.	
<b>Brief outline of the course:</b> 01.-02. Basic digital skills, DigComp framework, ECDL - modern web browser and its personalization - security, privacy, responsible use of DT 03.-05. Search, collection and evaluation of digital content - scanning, audio recording and speech resolution, optical resolution (OCR) - digital notebooks (Google keep, Evernote, Onenote) - evaluation of digital resources (Google forms and sections) 06.-08. Editing and creating digital content - cloud and interactive documents (text and spreadsheet editors - Google, Microsoft, Jupyter) - work with pdf documents, e-books and videos (Kami, Google books, Screencasting) 09. - 10. Organization, protection and sharing of digital content - modern LMS and cloud storage (Google Classroom, Microsoft team, Google Drive, Dropbox) - time management (Google Calendar) 11.-13. Digital communication and cooperation	

- collaborative interactive whiteboards (Jamboard, Whiteboard) - online presentations and online meetings (Google presentations, Powerpoint, Google meet, Microsoft teams)					
<b>Recommended literature:</b> 1. Carretero Gomez, S., Vuorikari, R. and Punie, Y., DigComp 2.1: The Digital Competence Framework for Citizens with eight proficiency levels and examples of use, Luxembourg, 2017, ISBN 978-92-79-68006-9, <a href="https://www.ecdl.sk/">https://www.ecdl.sk/</a> 2. Bruff, D. (2019). Intentional Tech: Principles to Guide the Use of Educational Technology in College Teaching (1st edition). Morgantown: West Virginia University Press. 3. Baker, Y. (2020). Microsoft Teams for Education. Amazon Digital Services. 4. Miller, H. (2021). Google Classroom + Google Apps: 2021 Edition. Brentford: Orion Edition Limited.					
<b>Course language:</b> slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 245					
A	B	C	D	E	FX
76.33	5.31	2.86	0.0	14.69	0.82
<b>Provides:</b> doc. RNDr. Jozef Hanč, PhD.					
<b>Date of last modification:</b> 26.01.2022					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚTVŠ/ LKSp/13	<b>Course name:</b> Summer Course-Rafting of TISA River
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week: 2 Per study period: 28</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b>	
<b>Course level:</b> I., II., P	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Completion: passed Condition for successful course completion: - active participation in line with the study rule of procedure and course guidelines - effective performance of all tasks: carrying a canoe, entering and exiting a canoe, righting a canoe, paddling	
<b>Learning outcomes:</b> Content standard: The student demonstrates relevant knowledge and skills in the field, which content is defined in the course syllabus and recommended literature. Performance standard: Upon completion of the course students are able to meet the performance standard and: - implement the acquired knowledge in different situations and practice, - implement basic skills to manipulate a canoe on a waterway, - determine the right spot for camping, - prepare a suitable material and equipment for camping.	
<b>Brief outline of the course:</b> Brief outline of the course: 1. Assessment of difficulty of waterways 2. Safety rules for rafting 3. Setting up a crew 4. Practical skills training using an empty canoe 5. Canoe lifting and carrying 6. Putting the canoe in the water without a shore contact 7. Getting in the canoe 8. Exiting the canoe 9. Taking the canoe out of the water 10. Steering a) The pry stroke (on fast waterways) b) The draw stroke	

11. Capsizing 12. Commands	
<b>Recommended literature:</b> 1. JUNGER, J. et al. Turistika a športy v prírode. Prešov: FHPV PU v Prešove. 2002. ISBN 8080680973. Internetové zdroje: 1. STEJSKAL, T. Vodná turistika. Prešov: PU v Prešove. 1999. Dostupné na: <a href="https://ulozto.sk/tamhle/UkyxQ2lYF8qh/name/Nahrane-7-5-2021-v-14-46-39#!ZGDjBGR2AQtkAzVkAzLkLJWuLwWxZ2ukBRLjnGqSomICMmOyZN==">https://ulozto.sk/tamhle/UkyxQ2lYF8qh/name/Nahrane-7-5-2021-v-14-46-39#!ZGDjBGR2AQtkAzVkAzLkLJWuLwWxZ2ukBRLjnGqSomICMmOyZN==</a>	
<b>Course language:</b> Slovak language	
<b>Notes:</b>	
<b>Course assessment</b> Total number of assessed students: 232	
abs	n
36.64	63.36
<b>Provides:</b> Mgr. Dávid Kaško, PhD.	
<b>Date of last modification:</b> 29.03.2022	
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.	

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚTVŠ/ KP/12	<b>Course name:</b> Survival Course
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week: 2 Per study period: 28</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b>	
<b>Course level:</b> I., II., P	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Completion: passed Condition for successful course completion: - active participation in line with the study rule of procedure and course guidelines, - effective performance of all the tasks defined in the course syllabus	
<b>Learning outcomes:</b> Content standard: The student demonstrates relevant knowledge and skills in the field, which content is defined in the course syllabus and recommended literature. Performance standard: Upon completion of the course students are able to meet the performance standard and should: - acquire knowledge about safe stay and movement in natural environment, - obtain theoretical knowledge and practical skills to solve extraordinary and demanding situations connected with survival and minimization of damage to health, - be able to resist and face situations related to overcoming barriers and obstacles in natural environment, - be able implement the acquired knowledge as an instructor during summer sport camps for children and youth within recreational sport.	
<b>Brief outline of the course:</b> Brief outline of the course: 1. Principles of conduct and safety in the movement in unfamiliar natural environment 2. Preparation and guidance of a hike tour 3. Objective and subjective danger in the mountains 4. Principles of hygiene and prevention of damage to health in extreme conditions 5. Fire building 6. Movement in the unfamiliar terrain, orientation and navigation 7. Shelters 8. Food preparation and water filtering 9. Rappelling, Tyrolian traverse 10. Transport of an injured person, first aid	

<b>Recommended literature:</b>	
1. JUNGER, J. et al. Turistika a športy v prírode. Prešov: Fakulta humanitných a prírodných vied PU v Prešove. 2002. 267s. ISBN 80-8068-097-3.	
2. PAVLÍČEK, J. Člověk v drsné přírodě. 3. vyd. Praha: Práh. 2002. ISBN 8072520598.	
3. WISEMAN, J. SAS: příručka jak přežít. Praha: Svojtka & Co. 2004. 566s. ISBN 8072372807.	
<b>Course language:</b> Slovak language	
<b>Notes:</b>	
<b>Course assessment</b> Total number of assessed students: 461	
abs	n
46.2	53.8
<b>Provides:</b> Mgr. Ladislav Kručanica, PhD.	
<b>Date of last modification:</b> 16.05.2023	
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.	

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KPE/SSU/15		<b>Course name:</b> Teachers' Support Groups			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 6.					
<b>Course level:</b> I., II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 65					
A	B	C	D	E	FX
83.08	9.23	6.15	0.0	0.0	1.54
<b>Provides:</b> doc. PaedDr. Renáta Orosová, PhD.					
<b>Date of last modification:</b> 12.03.2024					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KPPaPZ/TIMPR/25		<b>Course name:</b> Team Work			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b> 4., 6.					
<b>Course level:</b> I., P					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 0					
A	B	C	D	E	FX
0.0	0.0	0.0	0.0	0.0	0.0
<b>Provides:</b> PhDr. Anna Janovská, PhD.					
<b>Date of last modification:</b> 04.02.2025					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KPE/TVE/08		<b>Course name:</b> Theory of Education			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 4., 6.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 692					
A	B	C	D	E	FX
44.94	29.91	16.33	5.06	1.88	1.88
<b>Provides:</b> Mgr. Beáta Sakalová, PhD., Mgr. Zuzana Vagaská, PhD.					
<b>Date of last modification:</b> 12.03.2024					
<b>Approved:</b> prof. RNDr. Ondrej Hutník, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					