CONTENT

1. Academic English	3
2. Advanced Biochemistry Practical	5
3. Advanced Practical from Inorganic Chemistry	6
4. Advanced organic chemistry - Lab	8
5. Analytical chemistry I	10
6. Analytical chemistry I	12
7. Bachelor Thesis and its Defence	14
8. Basic Principles of Medicinal Chemistry	15
9. Basics of nanochemistry	17
10. Basis of Mineralogy	18
11. Battery and hydrogen technologies	20
12. Biochemistry I	22
13. Biochemistry I	23
14. Biochemistry II	24
15. Biochemistry Practical	25
16. Biochemistry of Nucleic Acids II	27
17. Biochemistry of Nucleic Acids I	29
18. Bioinorganic Chemistry I	31
19. Biotechnology	33
20. Chemical Engineering	35
21. Chemical calculations	36
22. Cheminformatics I	38
23. Cheminformatics II	40
24. Chemistry	42
25. Chemistry seminar I	44
26. Communicative Competence in English	46
27. Communicative Grammar in English	
28. Communicative Grammar in German Language	. 50
29. Cytology for Chemists	
30. English Language of Natural Science.	
31 Environmental Chemistry	56
32. Fundamentals of Bioanalytical Chemistry	
33 General Chemistry	60
34 General Chemistry	62
35 Green analytical chemisty and automatization	64
36 Industrial Ecology	66
37 Information Systems and Computational Technics in Chemistry	68
38 Inorganic Chemistry II	70
39 Inorganic Chemistry II	71
40 Inorganic chemistry	73
41 Instrumental Analytical Chemistry	75
42 Instrumental Analytical Chemistry	77
43 Introduction to General Physics for Chemist	79
44 Introduction to Material Chemistry	
45 Introduction to Study of Sciences	
46 Mathematics I for chemists	
47 Mathematics I for chemists	
48 Mathematics II for chemists	88
	00

49.	Methodology of experiment. Fundamentals	90
50.	Modern laboratories of analytical chemistry	92
51.	Nanotechnology	. 93
52.	Nanotechology II	. 95
53.	Nuclear Chemistry	. 97
54.	Odborná prax	. 99
55.	Odborná prax	100
56.	Organic Chemistry I	101
57.	Organic chemistry - Lab	103
58.	Organic chemistry II	105
59.	Organic reactions mechanisms	107
60.	Organická chémia II	109
61.	Physical Chemistry I	111
62.	Physical Chemistry II.	113
63.	Physical chemistry I	115
64.	Physics I	117
65.	Physics I	118
66.	Physics II	120
67.	Physics practical	122
68.	Practical from Inorganic Chemistry	123
69.	Practical in Analytical Chemistry.	124
70.	Practical in Physical Chemistry.	126
71.	Proseminár z chémie II	128
72.	Seaside Aerobic Exercise.	129
73.	Separation Methods	131
74.	Separation Methods Practicals	133
75.	Sports Activities I	134
76.	Sports Activities II	136
77.	Sports Activities III.	138
78.	Sports Activities IV	140
79.	Stereochemistry	142
80.	Structure determination - spectroscopic methods	144
81.	Structure determination - spectroscopic methods	146
82.	Students Scientific Conference	148
83.	Students' Digital Literacy	149
84.	Summer Course-Rafting of TISA River	151
85.	Survival Course	153
86.	Theory of electrochemical processes	155
87.	Základy regulačných procesov v biosystémoch	157

University: P. J. Šafárik University in Košice						
Faculty: Faculty of Science						
Course ID: CJP/ PFAJAKA/07	Course name: Academic English					
Course type, scope a Course type: Practic Recommended cour Per week: 2 Per stu Course method: pre	nd the method: ce rse-load (hours): dy period: 28 esent					
Number of ECTS cr	edits: 2					
Recommended seme	ster/trimester of the course:					
Course level: I.						
Prerequisities:						
Conditions for cours Active classroom par 1 test (13th week), no Presentation on chose Final evaluation- ave Grading scale: A 93-	ticipation, assignments handed in on time, 2 absences tolerated o retake. en topic rage assessment of test (50%), and presentation (50%). 100%, B 86-92%, C 79-85%, D 72-78%, E 65-71%, FX 64% and less					
Learning outcomes: The development of so of their linguistic cor syntactic aspects, dev for a given purpose, v	students' language skills - reading, writing, listening, speaking, improvement npetence - students acquire knowledge of selected phonological, lexical and relopment of pragmatic competence - students can effectively use the language with focus on Academic English, level B2.					
Brief outline of the c Formal and informal Academic English an Key academic verbs a Linking words in aca Word-formation - aff abstract Selected aspects of E Selected functional a paraphrasing	ourse: English Id its specific features and nouns demic writing, writing a paragraph, word-order, topic sentences ixation nglish pronunciation, academic vocabulary grammar structures - defining, classifying, epressing opinion, cause-effect,					
Recommended litera Seal B.: Academic En T. Armer :Cambridge M. McCarthy M., O' Zemach, D.E, Rumis Olsen, A. : Active Vo www.bbclearningeng Cambridge Academic	ncounters, CUP, 2002 English for Scientists, CUP 2011 Dell F Academic Vocabulary in Use, CUP 2008 ek, L.A: Academic Writing, Macmillan 2005 ocabulary, Pearson, 2013 lish.com c Content Dictionary, CUP, 2009					

Course language: English language, level B2 according to CEFR.							
Notes:	Notes:						
Course assessment Total number of assessed students: 416							
А	A B C D E FX						
36.54 21.63 15.14 9.38 6.01 11.3							
Provides: Mgr. Viktória Mária Slovenská							
Date of last modification: 20.09.2023							
Approved: doc	Approved: doc. RNDr. Ivan Potočňák, PhD.						

University: P. J.	. Šafárik Univers	ity in Košice					
Faculty: Faculty	y of Science						
Course ID: ÚC PPB/03	Course ID: ÚCHV/ Course name: Advanced Biochemistry Practical PB/03						
Course type, sc Course type: H Recommended Per week: 6 Pe Course metho	ope and the me Practice d course-load (h er study period: d: present	thod: ours): 84					
Number of EC	FS credits: 7						
Recommended	semester/trime	ster of the cours	e: 6.				
Course level: I.							
Prerequisities:	ÚCHV/BNK1/1	5 and ÚCHV/BN	K2/15				
Conditions for	course complet	on:					
Learning outco Deepening know	mes: wledge of the use	e of basic bioche	mical methods.				
Brief outline of Advanced pract subject on the n protein interact	the course: tice of biochemis nodern trends of tons.	stry is closely con molecular study	nnected to Practi of nucleic acids	ce of biochemisti , various DNA-lig	ry. The focus of gand and DNA-		
Recommended	literature:						
Course languag	ge:						
Notes:							
Course assessment Total number of assessed students: 151							
A B C D E FX							
50.99	39.07	7.28	1.99	0.66	0.0		
Provides: doc. 1	RNDr. Viktor Ví	glaský, PhD.	1				
Date of last mo	dification: 17.11	.2021					
Approved: doc.	RNDr. Ivan Pot	očňák, PhD.					

Faculty: Faculty of Science

Course ID: ÚCHV/	Course name: Advanced Practical from Inorganic Chemistry
PPA1/03	

Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: 6 Per study period: 84 Course method: present

Number of ECTS credits: 6

Recommended semester/trimester of the course: 6.

Course level: I.

Prerequisities: ÚCHV/ACHU/03 or ÚCHV/ACH2/03 or ÚCHV/ACH2/21

Conditions for course completion:

Evaluation based on the results of experimental work, protocols, written tests and the elaboration of assignments for each experimental exercise. The overall evaluation of the subject consists of four parts for which the student can obtain the following points: implementation of exercises (10 points), submission of protocols (20 points), elaboration of supplementary questions (30 points) and two written tests in the middle and at the end of the semester (2 x 25 b = 50 points). In total, the student can obtains 100 points and the evaluation scale is determined as follows: A (100-91%), B (90-81%), C (80-71%), D (70-61%), E (60-51%), Fx (50-0%).

Learning outcomes:

To provide students with the advanced techniques and methods used in the conventional and uncovnetional synthesis of inorganic compounds (non-aqueous solvents, inert gas envronment, reaction in solis state) and methods of their analysis.

Brief outline of the course:

Advanced syntheses of inorganic and coordination compounds, their identification and characterisation and applications.

Recommended literature:

Pokročilé praktikum z anorganickej, koordinačnej a bioanorganickej chémie Miroslav Almáši, Zuzana Vargová, Vladimír Zeleňák, Mária Ganajová Košice : Univerzita Pavla Jozefa Šafárika v Košiciach, 2017, 108 s., ISBN 9788081525698

Course language:

SK - slovak

Notes:

Teaching is carried out in person on a weekly basis at a set time according to the schedule, or in blocks if necessary (several exercises per week). The form of teaching is specified by the teacher at the beginning of the semester and updated continuously.

Course assessment Total number of assessed students: 98							
A B C D E FX							
94.9 4.08 1.02 0.0 0.0 0.0							
Provides: doc. RNDr. Miroslav Almáši, PhD.							
Date of last modification: 15.11.2021							
Approved: doc. RNDr. Ivan Potočňák, PhD.							

University: P. J. Ša	ărik Universit	y in Košice
----------------------	----------------	-------------

Faculty: Faculty of Science

Course ID: ÚCHV/	Course name: Advanced organic chemistry - Lab
PPOC/03	

Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: 6 Per study period: 84

Course method: present

Number of ECTS credits: 6

Recommended semester/trimester of the course: 6.

Course level: I.

Prerequisities: ÚCHV/OCH1a/10

Conditions for course completion:

100% participation in practical exercises.

Two written tests 2 x 25 pts (a minimum of 13 points must be obtained in each test), ten reports (in English) 10 x 2 pts, laboratory skills 10 pts, short quizzes and questions 20 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.

Learning outcomes:

The practical acquirements at preparation and study of organic compounds and their physicochemical properties by common laboratory techniques.

Advanced organic chemistry - laboratory practices is a preparation for the individual experimental work in a synthetic laboratory.

Brief outline of the course:

Advanced organic chemistry - laboratory practices is focused on mastering the advanced laboratory technique and methodology in synthesis of organic compounds (work in a small scale, chromatography, use of a equipment such as a magnetic stirring plates, vacuum rotary evaporator).

- 1. Preparation of isoamyl acetate
- 2. Isolation of limonene from citrus peel
- 3. Investigation into the stereoselectivity of Beckmann rearrangement
- 4. Preparation of diphenylmethanol by reduction
- 5. Protection of glucose by acetylation
- 6. Chemoselectivity in the reduction of 3-nitroacetophenone
- 7. Preparation of 3,5-diphenylisoxazoline by a 1,3-dipolar cycloaddition
- 8. Preparation and use of indigo
- 9. Preparation of 6-nitrosaccharin
- 10. Condensation of benzaldehyde with acetone

Recommended literature:

Harwood, L. M., Moody, CH. J. Experimental Organic Chemistry, Blackwell Scientific Publications, Oxford London 1990.

Course language:

Slovak and English							
Notes:							
Course assessment Total number of assessed students: 144							
A B C D E FX							
62.5 28.47 6.25 2.08 0.0 0.69							
Provides: RNDr. Mariana Budovská, PhD., univerzitná docentka, RNDr. Ján Elečko, PhD.							
Date of last modification: 21.07.2022							
Approved: doc	Approved: doc. RNDr. Ivan Potočňák, PhD.						

University is J. Dalatik University in KUSICO	University:	P. J	Šafárik	University	in Košice
---	-------------	------	---------	------------	-----------

Faculty: Faculty of Science

Course ID: ÚCHV/	Course name: Analytical chemistry I
ANCH1a/10	

Course type, scope and the method: Course type: Lecture / Practice

Course type: Lecture / Flactice

Recommended course-load (hours): Per week: 2 / 2 **Per study period:** 28 / 28

Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 4.

Course level: I.

Prerequisities:

Conditions for course completion:

Active participation in laboratory exercises and seminars; successful completion of the tests.

1. Participation in laboratory exercises is required. Assigned teacher who leads exercises justifying the student's absence (incapacity for work, family reasons, etc.) for a maximum of two exercises during the semester without substitute supplying.

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 50 points.
 Elaboration of 2 written assignments (or subject project), which will be one of the conditions

for participation in the exam.

4. The written test will consist of 10 questions with 50 points, together for 2 written testes of 100 points. (For the distance form of exams - written test will consist of 20 questions, for which the student can get a maximum of 100 points).

To successful completion of the exam, it is necessary to achieve at least 50% of points.

Learning outcomes:

Getting a knowledge of the theoretical principles and basics of analytical chemistry.

Brief outline of the course:

The subject of analytical chemistry, basic concept and terminology. Present problems of analytical chemistry. Classification of analytical methods. Analytical signal, its evaluation, evaluation of analytical data. Analytical chemistry of complicated, multicomponent consisting systems. Basic tools of analytical chemistry. Analytical experiment, classification of analytical concepts, choice of a suitable analytical method. Qualitative analysis, separation by selective coagulation with group reagent. Organic analysis, derivatisation. Protocol of analytical measurements. Equilibria in analytical chemistry, equilibrium constants, types of reactions used in analytical chemistry. Dissociation, buffer systems, pH, calculation. Solubility, calculation of solubility constant. Effect of various factors on solubility. Potential, calculation of potential. The use of competitive reactions suitable for potential regulation. Complex forming reactions, constants, calculation. Methods of quantitative analysis and gravimetry. Acidimetry and alcalimetry. Standardisation of volumetric reagent. Manganometry and iodometry. Back titration. Complex forming volumetric analysis.

Coagulative volumetric analysis. Titration curves, indication of point of equivalence. Gravimetry, basic principles, gravimetric factor.

Recommended literature:

1. Christian G.D.: Analytical Chemistry. John Wiley & Sons, Inc. New York – Chichester – Brisbane – Toronto – Singapore, 2004.

2. Harvey D.: Modern Analytical Chemistry. McGraw Hill, Boston, 2000.

3.Holtzclaw H.F., Jr., Robinson W.R. College Chemistry with Qualitation Analysis. D.C. Heath and Company, 1988.

4. Majer J. a kol. : Analytická chémia pre farmaceutické fakulty, Osveta, 1989.

5. Garaj J., Hladký Z., Labuda J.: Analytická chémia I. Vydavateľstvo STU. Bratislava, 1996.

6. Labuda J. a kol.: Analytická chémia. Vydavateľstvo STU. Bratislava, 2019.

7. Bazel Y. a kol.: Praktikum z analytickej chémie. Vydavateľstvo ŠafárikPress. Košice, 2019.

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.

Course assessment

Total number of assessed students: 366

А	В	С	D	Е	FX
6.56	14.21	25.68	31.42	19.67	2.46

Provides: prof. Dr. Yaroslav Bazel', DrSc., RNDr. Rastislav Serbin, PhD., RNDr. Jana Šandrejová, PhD., univerzitná docentka

Date of last modification: 15.11.2021

University: H	Э Ј.	Šafárik	University	v in	Košice
---------------	-------------	---------	------------	------	--------

Faculty: Faculty of Science

Course ID: ÚCHV/	Course name: Analytical chemistry I
ANCH1a/21	

Course type, scope and the method:

Course type: Lecture / Practice

Recommended course-load (hours): Per week: 2 / 2 **Per study period:** 28 / 28

Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 3.

Course level: I.

Prerequisities:

Conditions for course completion:

Active participation in laboratory exercises and seminars; successful completion of the tests.

1. Participation in laboratory exercises is required. Assigned teacher who leads exercises justifying the student's absence (incapacity for work, family reasons, etc.) for a maximum of two exercises during the semester without substitute supplying.

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 50 points.
 Elaboration of 2 written assignments (or subject project), which will be one of the conditions

for participation in the exam.

4. The written test will consist of 10 questions with 50 points, together for 2 written testes of 100 points. (For the distance form of exams - written test will consist of 20 questions, for which the student can get a maximum of 100 points).

To successful completion of the exam, it is necessary to achieve at least 50% of points.

Learning outcomes:

To provide studets with the basics and principles of analytical chemistry. Acquire practical skills of analytical techniques of qualitative and quantitative analysis, focusing mainly on the classical methods most used in practice.

Brief outline of the course:

Subject of analytical chemistry, basic concepts and terminology. Current problems of analytical chemistry. Classification of analytical methods. Analytical signal, analytical data processing. Basic tools of analytical chemistry. Analytical experiment, classification of analytical concepts, selection of a suitable analytical method. Sensitivity and selectivity of analytical methods. Overview of selected separation and preconcentration techniques. Qualitative analysis, group, selective and specific reagents. Organic analysis, derivatization. Analytical measurement protocol. Equilibria in analytical chemistry, equilibrium constants, types of reactions used in analytical chemistry. Dissociation, buffer systems, pH, calculation. Solubility, properties, calculation. Influence of various factors on solubility. Potential, potential calculation. Utilization of competitive reactions suitable for potential regulation. Complex-forming reactions, constants, calculation. Methods of quantitative analysis. Quantitative analysis, principles and basic concepts. Titration curves, equivalence point indication. Chemical visual indicators,

properties, indicator selection. Direct and back titration. Calculations in volume analysis and gravimetry. Standardization of the reagent medium solution. Methods based on acidbase reactions. Acidometry and alkalimetry. Redox titrations. Manganometry, bromatometry, bichromatometry, iodometry, cerimetry, titanometry. Complex-forming volumetric analysis. Chelatometry. Volumetric precipitation analysis. Argentometry. Gravimetry, basic principles, gravimetric factor. Examples of analytical determinations.

Recommended literature:

1. Christian G.D.: Analytical Chemistry. John Wiley & Sons, Inc. New York – Chichester – Brisbane – Toronto – Singapore, 2004.

2. Harvey D.: Modern Analytical Chemistry. McGraw Hill, Boston, 2000.

3.Holtzclaw H.F., Jr., Robinson W.R. College Chemistry with Qualitation Analysis. D.C. Heath and Company, 1988.

4. Majer J. a kol. : Analytická chémia pre farmaceutické fakulty, Osveta, 1989.

5. Garaj J., Hladký Z., Labuda J.: Analytická chémia I. Vydavateľstvo STU. Bratislava, 1996.

6. Labuda J. a kol.: Analytická chémia. Vydavateľstvo STU. Bratislava, 2019.

7. Bazel Y. a kol.: Praktikum z analytickej chémie. Vydavateľstvo ŠafárikPress. Košice, 2019.

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.

Course assessment

Total number of assessed students: 21

А	В	С	D	Е	FX
4.76	23.81	19.05	38.1	14.29	0.0

Provides: prof. Dr. Yaroslav Bazel', DrSc., RNDr. Rastislav Serbin, PhD., RNDr. Jana Šandrejová, PhD., univerzitná docentka

Date of last modification: 15.11.2021

University: P. J.	Šafárik Univers	ity in Košice			
Faculty: Faculty	of Science				
Course ID: ÚCI BPO/14	HV/ Course na	me: Bachelor Th	nesis and its Def	ènce	
Course type, sc Course type: Recommended Per week: Per Course method	ope and the met l course-load (h • study period: d: present	hod: ours):			
Number of ECT	FS credits: 4				
Recommended	semester/trimes	ster of the course	e:		
Course level: I.					
Prerequisities:					
Conditions for a	course completi	on:			
Learning outco	mes:				
Brief outline of Oral presentation the state examine	the course: on of the thesis relation board.	esults. Answerin	g questions of tl	he thesis oponen	t or members of
Recommended	literature:				
Course languag slovak	je:				
Notes:					
Course assessm Total number of	ent Sassessed studen	ts: 255			
А	В	С	D	E	FX
88.63	8.24	1.57	1.57	0.0	0.0
Provides:				•	
Date of last mo	dification: 07.12	2.2021			
Approved: doc.	RNDr. Ivan Pote	očňák, PhD.			
L					

University: F. J. Salarik University in Ku
--

Faculty: Faculty of Science

Course ID: ÚCHV/	Course name: Basic Principles of Medicinal Chemistry
FMZ/04	

Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28

Course method: present

Number of ECTS credits: 3

Recommended semester/trimester of the course: 6.

Course level: I.

Prerequisities:

Conditions for course completion:

Exam: Two written tests 2 x 50 pts., one test in the middle of the semester, the other in the examination period. A minimum of 26 points must be obtained in each test.

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.

Learning outcomes:

The student will acquire knowledge of the fundamental conceptions of medicinal chemistry, understanding of structure-activity relationships including space structure and chirality and their consequences on chemical and physico-chemical properties influencing biological activity. Gaining knowledge of the present state in the field of selected important groups of drugs, such as antibacterial, antiviral or antitumor drugs.

Brief outline of the course:

Introduction, classification of drugs, factors influencing design and activity of drugs of the third generation, drug chirality, search for new drugs, structure-activity relationships, antibacterial compounds, antitumor compounds, antiviral compounds, disinfectants, antitussives and expectorants.

- 1. The essence, subject and goal of medicinal chemistry
- 2. Factors influencing design and activity of drugs
- 3. Drug chirality
- 4. Search for new drugs
- 5. Structure-activity relationships
- 6. Chemotherapeutics of central and peripheral nervous system
- 7. Antibacterial compounds
- 8. Antitumor compounds
- 9. Antiviral compounds
- 10. Psychotropic drugs
- 11. Disinfectants
- 12. Antitussives and expectorants

Recommended literature:

1. Medicinal Chemistry: Principles and Practice, King F. D., Ed., The Royal Society of Chemistry, Thomas Graham House, Cambridge, 1994.

Advances in Drug Discovery Techniques: Harvey A. L., Ed., Wiley & Sons, Chichester, 1998.
 Thomas G.: Medicinal Chemistry: An introduction. John Willey & Sons, 2000.

Course languages		
Course language:		
Slovak		

Notes:

Teaching is carried out in person or, if necessary, online using the BBB (BigBlueButton) 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: 230

А	В	С	D	Е	FX
40.0	22.17	18.26	10.43	8.26	0.87

Provides: RNDr. Mariana Budovská, PhD., univerzitná docentka

Date of last modification: 21.07.2022

University: P. J.	Šafárik Univers	sity in Košice			
Faculty: Faculty	v of Science	<i>J</i>			
Course ID: ÚC	HV/ Course n	ma: Basics of n	anochemistry		
ZNCH/21		anie. Dasies of h	anochennisu y		
Course type, sc	ope and the me	thod:			
Course type: I	Lecture / Practice	e (
Recommended	l course-load (h	ours):			
Course metho	d• present	00: 20 / 14			
Number of ECT	FS credits: 4				
Recommended	semester/trime	ster of the cours	e: 5.		
Course level: I.					
Prerequisities:					
Conditions for	course complet	ion:			
Learning outco	mes:				
Brief outline of	the course:				
Recommended	literature:				
Course languag	ge:				
Notes:					
Course assessm	ent				
Total number of	f assessed studer	its: 0			
A	В	С	D	E	FX
0.0	0.0	0.0	0.0	0.0	0.0
Provides: prof.	RNDr. Vladimír	Zeleňák, DrSc.			
Date of last mo	dification: 21.11	.2021			
Approved: doc.	RNDr. Ivan Pot	očňák, PhD.			

University: r. J. Salarik Unive	ersity in	Kosice
---------------------------------	-----------	--------

Faculty: Faculty of Science

Course ID: ÚCHV/	Course name: Basis of Mineralogy
MIN1/14	

Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 2 / 1 Per study period: 28 / 14

Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 4., 6.

Course level: I.

Prerequisities: 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

Conditions for course completion:

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 %).

Learning outcomes:

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.

Brief outline of the course:

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.

Recommended literature:

M. Košuth: Mineralógia. Elfa, s.r.o. Košice, 2001 V. Radzo: Mineralógia, Alfa Bratislava, 1987.

Course language:

Slovak

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: 140					
А	В	С	D	Е	FX
85.0	12.86	0.71	0.71	0.0	0.71
Provides: doc. RNDr. Ivan Potočňák, PhD.					
Date of last modification: 21.07.2022					
Approved: doc	Approved: doc. RNDr. Ivan Potočňák, PhD.				

University: P. J. Šafá	University: P. J. Šafárik University in Košice				
Faculty: Faculty of S	cience				
Course ID: ÚCHV/ BVT/21	Course name: Battery and hydrogen technologies				
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 2 / 1 Per study period: 28 / 14 Course method: present					
Number of ECTS credits: 5					
Recommended semester/trimester of the course: 5.					
Course level: I.					

Prerequisities:

Conditions for course completion:

1. Participation in seminars (also applies to the online form of teaching) and laboratory practical exercises. Students are required to attend seminars and laboratory exercises. 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 or laboratory exercises 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 and laboratory practical exercises. The preparation of students and their regular monitoring is always assessed by the relevant teacher who conducts the seminar or laboratory exercise, within his/her competence.

3. 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.

4. To successfully master the subject, it is necessary to prove mastery of the required curriculum at least 51%.

Learning outcomes:

Students will gain knowledge and skills on battery and hydrogen technologies for a low-carbon economy.

Brief outline of the course:

Description of primary and secondary batteries and their role in the energy system: different battery types, concepts describing the storage capabilities of batteries in context of both energy and power, advantages and disadvantages. How an electric power system can affect the operation of a battery, for example, in a vehicle or for large scale storage. Different cathode and anode materials, electrolytes, additives in Li-ion batteries. Description of other hybrid storage systems: water power, flywheels, supercapacitors, fuel cells, etc. Calculation of capacity, efficiency, state of charge, Li diffusion rate, etc.

Hydrogen technologies, hydrogen as an energy carrier, transition to a low-carbon economy, hydrogen valleys, hydrogen production, storage and distribution of hydrogen, electrolysis, fuel cell. Use of hydrogen as an energy storage, to power cars, for industry, buildings and households. Principle and types of electrolyzers.

Principle and types of fuel cells.

Recommended literature:

Course language:

Slovak language.

Notes:

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.

Course assessment

Total number of assessed students: 4

А	В	С	D	Е	FX
50.0	50.0	0.0	0.0	0.0	0.0

Provides: prof. RNDr. Renáta Oriňaková, DrSc., prof. RNDr. Andrej Oriňak, PhD., doc. RNDr. Andrea Straková Fedorková, PhD., RNDr. Ivana Šišoláková, PhD., univerzitná docentka

Date of last modification: 25.11.2021

University: P. J. Šafárik University in Košice							
Faculty: Faculty of Science							
Course ID: ÚCHV/ BCH1a/03Course name: Biochemistry I							
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present							
Number of ECTS credits: 3							
Recommended semester/trimester of the course: 3.							
Course level: I., II.							
Prerequisities:							
Conditions for course completion: Test and oral examination.							
Learning outcomes: The aim of Biochemistry I teaching is to acquire knowledge in the field of living organisms on the basis of the molecular structure and properties of biolomolecules.							
Brief outline of the course: Basic information on structure and properties of biomolecules(aminoacids, nucleotides,lipids, sugars, proteins, polynucleotides, polysaccharides, membranes, signal molecules).							
Recommended literature: Voet D., Voetová J. G., Biochemie, Victoria Publishing, Praha, 1994 Škárka B., Ferenčík M., Biochémia, Alfa, Bratislava, 2001 Musil J., Nováková O., Biochemie v obrazech a schématech, Avicenum, Praha, 1990 Berg J. M., Tymoczko J. L., Stryer L., Biochemistry, W. H. Freeman and Company, NY, 2007							
Course language:							
Notes:							
Course assessment Total number of assessed students: 673							
A B C D E FX							
12.63 22.29 32.1 15.75 16.49 0.74							
Provides: prof. Ing. Marián Antalík, DrSc., RNDr. Nataša Tomášková, PhD.							
Date of last modification: 18.11.2021							
Approved: doc. RNDr. Ivan Potočňák, PhD.							

University: P. J.	. Šafárik Univers	ity in Košice					
Faculty: Faculty	y of Science						
Course ID: ÚC BCH1a/21	HV/ Course na	me: Biochemist	ry I				
Course type, sc Course type: I Recommended Per week: 2 / 1 Course method	ope and the met Lecture / Practice I course-load (h Per study period: present	thod: ours): od: 28 / 14					
Number of EC	FS credits: 4						
Recommended	semester/trimes	ster of the cours	e: 3.				
Course level: I.							
Prerequisities:							
Conditions for	course completi	on:					
Learning outco	mes:						
Brief outline of	the course:						
Recommended	literature:						
Course languag	ge:						
Notes:							
Course assessm Total number of	ent f assessed studen	ts: 23					
А	В	С	D	Е	FX		
17.39	17.39 26.09 21.74 17.39 17.39 0.0						
Provides: prof. Kožurková, CSc	Ing. Marián Anta :.	alík, DrSc., RND	r. Nataša Tomášk	xová, PhD., prof.	RNDr. Mária		
Date of last modification: 18.11.2021							
Approved: doc.	RNDr. Ivan Pot	očňák, PhD.					

University: P. J. Šafárik University in Košice						
Faculty: Faculty of Science						
Course ID: ÚCHV/ BCH1b/10Course name: Biochemistry II						
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 3 / 1 Per study period: 42 / 14 Course method: present						
Number of ECTS credits: 5						
Recommended semester/trimester of the course: 4.						
Course level: I.						
Prerequisities: ÚCHV/BCH1a/03 or ÚCHV/BCH1a/21						
Conditions for course completion: Test and oral examination.						
Learning outcomes: The aim of biochemistry teaching is to acquire knowledge in the field of living organisms on t basis of their molecular structure information on cell metabolism. Brief outline of the course:						
Basic principle of metabolism, basic metabolic pathways and cycles, integration of cell metabolism						
Recommended literature: 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.						
Course language:						
Notes:						
Course assessment Total number of assessed students: 377						
A B C D E FX						
9.02 19.63 31.03 18.3 21.22 0.8						
Provides: 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						
Date of last modification: 26.07.2022						
Approved: doc. RNDr. Ivan Potočňák, PhD.						

University	P 1	I Šafárik	University	in Košice
University.	F. J	J. Salalik	University	III KUSICE

Faculty: Faculty of Science

Course ID: ÚCHV/	Course name: Biochemistry Practical
PBC1/00	

Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: 6 Per study period: 84 Course method: present

Number of ECTS credits: 6

Recommended semester/trimester of the course: 4.

Course level: I.

Prerequisities: ÚCHV/BCH1a/03 or ÚCHV/BCH1a/21

Conditions for course completion:

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.

Learning outcomes:

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.

Brief outline of the course:

1. Biochemistry laboratory safety rules. Basic biochemical laboratory procedures.

- 2. Qualitative tests for amino acids and proteins.
- 3. Isolation of casein from milk. Determination of protein concentration by Lowry method.

4. Determination of the iodine number by Yasud method . Soap production. Reactions with soap. Oxidation of unsaturated fatty acids.

5. Saponification number of fats and oils. Qualitative test for cholesterol: Salkowsky reaction.

6. Qualitative tests for carbohydrates. Determination of reducing carbohydrates by the Schoorl's method.

7. Determination of reducing and nonreducing carbohydrates in germinant plants.

8. Time-dependent course of enzyme-catalyzed reaction: digestion of gelatin by trypsine.

9. Determination of catalase activity and the first order rate constant. Effect of pH on alpha-amylase activity.

10. Effect of substrate concentration on initial rate of reaction, determination of Km and Vmax for urease-catalyzed hydrolysis of urea.

11. Isolation of DNA from spleen. Isolation of RNA from yeast. Qualitative tests for DNA and RNA components.

12. Determination of vitamin C concentration by 2,4-dinitrofenylhydrazine. Determination of vitamins A, B1, and C.

13. Final evaluation of students.

Recommended literature:

Sedlák, Varhač, Danko, Paulíková, Podhradský: Praktické cvičenia z biochémie, 2020, https://unibook.upjs.sk/sk/chemia/1411-prakticke-cvicenia-z-biochemie

Course language:

Slovak

Notes:

Teaching is carried out in person.

Course assessment

Total number of assessed students: 471

А	В	С	D	Е	FX
56.05	26.96	10.19	5.1	1.27	0.42

Provides: prof. RNDr. Mária Kožurková, CSc., RNDr. Nataša Tomášková, PhD., doc. RNDr. Rastislav Varhač, PhD., RNDr. Danica Sabolová, PhD., univerzitná docentka

Date of last modification: 19.11.2021

University: P. J	. Šafárik Univers	sity in Košice			
Faculty: Facult	y of Science				
Course ID: ÚC BNK2/15	HV/ Course n	ame: Biochemist	ry of Nucleic Ac	eids II	
Course type, so Course type: Recommended Per week: 3 P Course metho	cope and the me Lecture d course-load (h er study period d: present	thod: nours): : 42			
Number of EC	TS credits: 5				
Recommended	semester/trime	ster of the cours	e: 6.		
Course level: I.					
Prerequisities:	ÚCHV/BNK1/1	5			
Biochemistry o Participation in The lecturer giv family reasons, substitution. In demonstrate ma	f nucleic acids I lectures (also by ving the lecture etc.) for a maxim the case of a astery of the miss	exam. distance learnin and the related se num of two lecture longer excused sed material in an	g). eminar will excu es/seminars durin absence (e.g. du agreed manner;	ise the student's a ng the semester will ue to illness), the oral examination	absence (illness, ithout additional ne student must n
Learning outco To provide stud based on mater	omes: lents with more a ial provided in B	advanced practication between the second structure and the second struc	al and theoretical fucleic Acids I.	knowledge of D	NA and its uses
Brief outline of Basic principles Gene engineeri Preparation of r DNA amplifica Analyses of nuc Applying of gen	the course: s of isolation and ng and enzymati recombinant DN tion methods; PO cleic acids, DNA netic manipulatio	l purification of n c tools, A, CR, RT PCR, SEI sequencing, ons.	ucleic acids and LEX, etc.,	their characteriz	ation,
Recommended J. Turňa a kol.: Sambrook a et a	literature: Rekombinantná al.: Molecular cl	DNA a biotechno oning - a laborate	ológie ory manual		
Course languag	ge:				
Notes:					
Course assessm	ient	nts: 140			
A	B	C	D	Е	FX
25.0	27.14	22.14	22.14	3.57	0.0

Provides: doc. RNDr. Viktor Víglaský, PhD.

Date of last modification: 17.11.2021

University: P. J.	Šafárik	University	in Košice
-------------------	---------	------------	-----------

Faculty: Faculty of Science

Course ID: ÚCHV/	Course name: Biochemistry of Nucleic Acids I
BNK1/15	

Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 3 Per study period: 42 Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities:

Conditions for course completion:

Participation in lectures (also by distance learning).

The lecturer conducting the lecture/seminar will excuse the justified absence of the student (sickness, family reasons, etc.) at a maximum of two lectures/seminars during the semester without the need for a substitute. In the event of longer-term justified absence (e.g. due to sickness), the student must provide evidence of mastery of the missed course content by means of an agreed substitute; oral examination.

Learning outcomes:

To provide students with basic knowledge and understanding of molecular biology with emphasis on nucleic acid related processes.

Brief outline of the course:

The structure and biological function of proteins, RNA and DNA structure, the structure of prokaryotic and eukaryotic chromosomes. Genetic information, genetic code, gene and transcription unit of prokaryotes and eukaryotes, exones and introns, codon and anticodon. DNA in the nucleus and extrachomosomal DNA. Replication of bacterial genome, chromosomal and plasmid DNA, replication of eukaryotic genome. Trancription of bacteria genome, structural genes, rRNA and tRNA, transcription of eukaryotic genome. RNA polymerase II, I and III. Post-transcription modification of eukaryotic RNA, hnRNA, pre-mRNA, pre-tRNA. Translation of nucleic acids, post-translation modification of proteins. Regulation of gene expression in eukaryotes and prokaryotes on the transcription and translation levels. Life cycle of cells and its regulation, ontogenic development. DNA recombination, essential of mutagenesis. DNA repair.

Recommended literature:

Alberts B. et al. Molecular Biology of the Cell, 5th or 6th Edition Rosypal: Úvod do molekulárnej biológie (I, II, III diel) Scientific publications.

Course language:

Notes:

Course assessment Total number of assessed students: 255						
А	A B C D E FX					
12.94	16.47 29.02 26.27 13.33 1.96					
Provides: doc. RNDr. Viktor Víglaský, PhD.						
Date of last modification: 12.11.2021						
Approved: doc. RNDr. Ivan Potočňák, PhD.						

COURSE INFORMATION LETTER						
University: P. J. Šafárik University in Košice						
Faculty: Faculty of Science						
Course ID: ÚC BAC1/04	ourse ID: ÚCHV/ Course name: Bioinorganic Chemistry I AC1/04					
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 2 / 1 Per study period: 28 / 14 Course method: present						
Number of EC	TS cre	dits: 5				
Recommended	semes	ter/trimes	ster of the cours	e: 5.		
Course level: I.	, II.					
Prerequisities:						
Conditions for Test or seminar examination	course works	e completi	on:			
Learning outco The basic know biocatalysis, mo metals in the en	Learning outcomes: 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.					
Brief outline of the course: Metalic and non-metalic 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.						
 Recommended literature: 1. Shriver D. F., Atkins P. W., Overton T. L., Rourke J.P., Weller M.T., Amstrong F.A.: Shiver & 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. 						
Course language:						
Notes:						
Course assessment						
A	1 05555	B	C	D	Е	FX
42.36	2	27.61	19.03	5.9	4.83	0.27
Provides: prof.	Provides: prof. RNDr. Zuzana Vargová, Ph.D.					
Toviacs. pior. Rivid. Zuzana vargova, Th.D.						

Date of last modification: 28.10.2021

University: P. J. Šafárik University in Košice						
Faculty: Faculty of Science						
Course ID: ÚCHV/ BTC/04	V/ Course name: Biotechnology					
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 3 Per study period: 42 Course method: present						
Number of ECTS cr	edits: 5					
Recommended seme	ester/trimes	ster of the course	e: 6.			
Course level: I.						
Prerequisities:						
Conditions for cours Written test, from wh	se completinich the stud	on: lent must obtain a	at least 51 %.			
Learning outcomes: Students obtained th agriculture, industry,	Learning outcomes: Students obtained the knowledge of basic biotechnological processes and their applications in agriculture industry environmental technologies food production and medicine					
Characterization of biotechnology. Methods of cultivation and preservation of microorganisms. Composition, preparation and sterilization of nutrient soils. Classification of bioreactors. Biogas. Biotechnological waste treatment. Importance of carbohydrates and lipids produced by microorganisms. Aerobic and anaerobic fermentation. Biotechnological production of alcohols, organic acids and solvents. Isolation and using of amino acids. Production of yeast, vitamin C and antibiotics						
Recommended literature: Z. Vodrážka: Biotechnologie, Academia Praha, 1992. B. Sykita: Biotechnologie pro farmaceuty, FaF UK Praha, 1984. E.M.T. El-Mansi et al, Fermentation microbiology and biotechnology,second edition, 2007. Y.H. Hui, Food biochemistry & food processing, Blackwell Publishing 2006. J.E. Smith, Biotechnology, Cambridge university press 2009.						
Course language: Slovak, English						
Notes:						
Course assessment Total number of assessed students: 165						
A	В	С	D	Е	FX	
34.55	28.48 22.42 10.91 3.03 0.61					
Provides: RNDr. Danica Sabolová, PhD., univerzitná docentka						
Date of last modification: 11.01.2022						

University:	University: P. J. Šafárik University in Košice						
Faculty: Fa	Faculty: Faculty of Science						
Course ID: ZCVU/04	se ID: ÚCHV/ Course name: Chemical Engineering						
Course type Course type Recomment Per week: Course mo	Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 2 / 1 Per study period: 28 / 14 Course method: present						
Number of	ECTS cre	edits: 5					
Recommen	ded seme	ster/trimester	of the cours	e: 6.			
Course leve	el: 1., 111.						
Prerequisit	ies:						
Conditions	for cours	e completion:					
Learning o	utcomes:						
Brief outline of the course: General and Inorganic Engineering; Mineral raw materials; Raw materials processing, transport and holding; Chemical reactors; Chemical metallurgy – Fe, Al, Cu working; Inorganic acids manufacture (H2SO4, HNO3, HCl, HF, H3PO4); Industrial electrochemistry; Industrial fertilizers; Silicate industry – cement manufacture, ceramics; Petrochemistry							
Recommended literature:							
Course language:							
Notes:							
Course assessment Total number of assessed students: 22							
А	В	C	D	Е	FX	Ν	Р
22.73	22.73 54.55 13.64 4.55 0.0 0.0 0.0 4.55						4.55
Provides: prof. RNDr. Zuzana Vargová, Ph.D.							
Date of last	modifica	tion: 21.01.202	.2				
Approved:	doc. RND	r. Ivan Potočňá	k, PhD.				

University	Р	ТŠ	Šafárik	Univer	sitv	in	Košice
University.	1	J. K	Jararik	University	SILY	ш	RUSICC

Faculty: Faculty of Science

Course ID: ÚCHV/	Course name: Chemical calculations
CHV1/99	

Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present

Number of ECTS credits: 2

Recommended semester/trimester of the course: 1.

Course level: I.

Prerequisities:

Conditions for course completion:

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%).

Learning outcomes:

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.

Brief outline of the course:

Expression of the clear matter amount and the system composition. Stoichiometric formula. Material bilances for preparation, dissolving and mixing of solutions, and for separating of mixtures. Material bilances for combined processes. Chemical equations and material bilances in the systems with chemical processes. Acid-Base equilibrium and the pH calculations. The solubility product and solubility.

Recommended literature:

Potočňák I.: Chemické výpočty vo všeobecnej a anorganickej chémii (skriptum), PF UPJŠ, Košice, 2017.

https://unibook.upjs.sk/sk/chemia/843-chemicke-vypocty-vo-vseobecnej-a-anorganickej-chemii Any chemical laboratory tables.

Course language:

SK - slovak

Notes:

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.
Course assessment Total number of assessed students: 1722							
А	В	С	D	Е	FX		
26.02	18.99	22.18	19.57	11.96	1.28		
Provides: RNDr. Martin Vavra, PhD., doc. RNDr. Miroslav Almáši, PhD., Mgr. Nikolas Király, PhD.							
Date of last modification: 15.11.2021							
Approved: doc. RNDr. Ivan Potočňák, PhD.							

University: P. J.	Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/	Course name: Cheminformatics I
ISC1a/00	

Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present

Number of ECTS credits: 2

Recommended semester/trimester of the course: 1.

Course level: I.

Prerequisities:

Conditions for course completion:

In order to pass this course, each student must complete ALL of the following compulsory requirements:

Students may only miss 1 session. Students must demonstrate the ability to work with electronic information sources available within the licenced access of the University library and must submit all assignments (10). Students must complete: 4 assignments using scientometric database Scopus and Web of Science; 2 assignments using factual database ChemSpider or other available factual database; 6 assignments using software ACDLabs/ChemSketch, respectively other possible editor of chemical structures. Students are assigned a grade in the course on the basis of submitted assignments. Students must obtain at least 51 percent of the total number of points within all submitted assignments. Students are assigned a grade in the course as follows: 100 - 91% (A), 90 - 81% (B), 80 - 71% (C), 70 - 61% (D), 60 - 51% (E), 50% and less FX. The examination can be extended to written and/or oral test as the examiner may determine.

Learning outcomes:

Graduates of the course have knowledge of the existence and specific properties of chemical (scientific) information, the structure and availability of information sources (both classical and electronic) and acquire the skills necessary for searching, sorting and processing of professional information. The acquired knowledge and skills will enable them to independently use information resources for studying, preparing seminar papers, projects, theses, etc.

Brief outline of the course:

Searching, retrieving and use of the informations in chemistry. Using of "paper" resources (primary journals, Chemical Abstracts). Searching chemical information on Internet (Chemical Abstracts, Science Citation Index, Scopus, Web of Science, ChemSpider) and e-journals.

Recommended literature:

1. R.E. Maizell: How to find Chemical Information, John Wiley,

New York 1998

2. Internet resources for chemistry.

Course language:

slovak language and english language

Notes:

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.

Course assessment							
Total number o	f assessed studen	ts: 966					
А	A B C D E FX						
73.81	73.81 7.14 10.97 5.9 1.35 0.83						
Provides: RND	Provides: RNDr. Monika Tvrdoňová, PhD., doc. RNDr. Ladislav Janovec, PhD.						
Date of last modification: 11.08.2022							
Approved: doc. RNDr. Ivan Potočňák, PhD.							

Faculty: Faculty of Science

Course ID: ÚCHV/	Course name: Cheminformatics II
ISCH1b/03	

Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 1 / 2 Per study period: 14 / 28

Course method: present

Number of ECTS credits: 4

Recommended semester/trimester of the course: 6.

Course level: I.

Prerequisities: ÚCHV/ISC1a/03 or ÚCHV/ISC1a/00 or ÚCHV/ISVTC/14

Conditions for course completion:

In order to pass this course, each student must complete ALL of the following compulsory requirements: Students may only miss 1 exercise. Students must demonstrate the ability for advanced search in electronic information sources available within the licenced access of the University library and must submit all assignments (6). Students must complete: 2 assignments using scientometric database Scopus and/or Web of Science; 4 assignments using ChemSpider, Protein Data Bank, spectral or crystallographic databases, respectively other factual databases. Students must present a seminar works (3 presentations) within semester using sources of popular science websites and/or standard science portals as well. Students are assigned a grade in the course on the basis of submitted assignments. The final evaluation is assigned on the basis of the mark obtained within all submitted assignments. Students are assigned a grade in the course as follows: 100 - 91% (A), 90 - 81% (B), 80 - 71% (C), 70 - 61% (D), 60 - 51% (E), 50% and less FX. The examination can be extended to written and/or oral test as the examiner may determine.

Learning outcomes:

The student has the skills necessary for searching, sorting and processing scientific information in databases such as Web of Science, Cambridge structural database.... The acquired knowledge and skills should enable them to independently use specialized information sources for the preparation of bachelor theses, projects, diploma theses, etc..

Brief outline of the course:

Science Citation Index (Web of Science). Important scientific and chemical portals on the Internet (ChemWeb, Scopus, ..). Presentations of chem. data in electronic form. Chemical information and web applications. Factual databases - ChemSpider, PubChem, ... Structural databases - CSD, PDB, ...Presentation of seminar work.

Recommended literature:

1. Gasteiger J.(Editor), Engel T.(Editor): Chemoinformatics : A Textbook. John Wiley & Sons, 2004, ISBN 3-527-30681-1

2. Internet resources

Course language:

slovak language and english language

Notes:

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.

Course assessment							
Total number o	f assessed studen	ts: 110					
А	A B C D E FX						
99.09	0.0	0.0	0.0	0.91	0.0		
Provides: doc. RNDr. Ivan Potočňák, PhD., doc. RNDr. Ladislav Janovec, PhD.							
Date of last modification: 11.08.2022							
Approved: doc. RNDr. Ivan Potočňák, PhD.							

University	DΙ	Šafárilz	Univora	ity in	Kačiaa
University.	Г. J.	Salalik	Univers	пу ш	RUSICE

Faculty: Faculty of Science

Course ID: ÚCHV/ Course name: Chemistry BSS/14

Course type, scope and the method: Course type:

Recommended course-load (hours):

Per week: Per study period:

Course method: present

Number of ECTS credits: 4

Recommended semester/trimester of the course:

Course level: I.

Prerequisities: (ÚCHV/ACH2/03 or ÚCHV/ACH2/21) and (ÚCHV/ANCH1b/03 or ÚCHV/ ANCH1b/21) and ÚCHV/BCH1b/10 and ÚCHV/FCH1b/10 and (ÚCHV/OCH1b/03 or ÚCHV/ OCH1b/21) and ÚCHV/BNK2/15 or (ÚCHV/MUS/21 or ÚCHV/MUS/03)

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Analytical chemistry.

Analytical chemistry, basic concepts. Qualitative and quantitative analysis. Group, selective and specific reactions. Principle and utilising of gravimetry. Volumetric analysis. Instrumental analytical methods. Classification, basic concepts and terminology. UV/VIS spectrophotometry. Luminiscent analysis. Infrared and Raman spectroscopy. Atomic absorption and atomic emission spectroscopy. Mass spectroscopy. Potentiometry. Electrogravimetric metods. Conductometry. Coulometry. Voltamperometry. Polarography. Separation and preconcentration methods. Inorganic chemistry.

Subject of inorganic chemistry. Systematic nomenclature of inorganic compounds. Reactions of inorganic compounds. Overview of the properties of nonmetallic elements and their compounds: evolution of the properties according to groups and periods. Metals and alloys. Overview of general properties of metals, semimetals and their compounds. General properties of the transition elements and their compounds with emphasis on the elements of the first transition series. Lanthanides and actinides. Metals and semimetals of the p-block, their properties.

Biochemistry.

Proteins - primary, secondary, tertiary and quarterly structures of proteins. Enzymes - structure and enzymatic catalysis. Enzymatic activity - influence of pH and temperature on enzymatic activity. Regulation of enzymatic activity. Nucleic acids - structure and function. Mechanism of replication, transcription and translation of DNA. Methods of genetic engineering. Metabolic processes. Glycolyse. Gluconeogenesis. Citrate cycle. Oxidative phosphorylation. Respiratory chain. Photosynthesis. Metabolism of fat acids. Metabolism of aminoacids. Urea cycle.

Physical chemistry.

Principles of chemical kinetics, reaction rate, reaction order and molecularity, reaction constant. Kinetic classification of reactions. Thermodynamic and kinetic control of reactions. Catalysis. Chemical thermodynamics. Reaction heat. Entropy. Thermochemical laws. Activation Gibbs energy. Chemical equilibrium, equilibrium constant, affinity and standard affinity, influence of temperature, pressure and composition on chemical equilibrium. Phase equilibrium. Organic chemistry.

Organic chemistry - basic concept, configuration and conformation of alkanes and cycloalkanes, stereochemistry of organic compounds, enantiomers and diastereoisomers, bonds in organic componds, reactions of alkenes, alcohols, amines, alkyl halides and aromatic compounds. Electrophiles and nucleophiles.

Recommended literature:

Course language:

slovak

Notes:

Course assessment							
Total number of assessed students: 188							
А	В	С	D	Е			
20.2	26.06	10.00	0.57	6.01			

 38.3
 26.06
 18.09
 9.57
 6.91
 1.06

 Provides:

FX

Date of last modification: 22.09.2021

University: P. J. Šafá	rik University in Košice
Faculty: Faculty of S	cience
Course ID: ÚCHV/ PRCH1/10	Course name: Chemistry seminar I
Course type, scope a Course type: Practic Recommended cour Per week: 1 Per stu Course method: pre	nd the method: ce rse-load (hours): dy period: 14 esent
Number of ECTS cr	edits: 1
Recommended seme	ster/trimester of the course: 1.
Course level: I.	
Prerequisities:	
Conditions for cours 1. Demonstration of 1 2. Completion of 3 w with a success rate of 3. Completion of 1x5 success rate of min. 5 4. 100% participation submission of confirm A 100 pts. in total. A	Exampletion: knowledge of the nomenclature of inorganic and organic compounds. vritten works for a total 50 pts on the nomenclature of inorganic compounds fmin. 51% from each test. 50 pts credit written work on the nomenclature of organic compounds with a 51%. in all seminars. For serious reasons, non-participation can be justified upon nation. ssessment A: 91-100; B: 81-90; C: 71-80; D: 60-71; E: 51-60; FX: 0-50 pts.
Learning outcomes: The students will bec compounds.	ome familiar with the basics of IUPAC nomenclature of inorganic and organic
 Brief outline of the c 1. Nomenclature of bic compounds. 2. Noenclature of alk 3. Nomenclature of th 4. Nomenclature of th 5. Nomenclature of h 6. Nomenclature of c 7. Nomenclature of c 8. Nomenclature of o 9. Nomenclature of o 	ourse: inary and pseudobinary compounds, acids, salts, double salts and coordination anes, alkenes, alkynes, cyclic and aromatic hydrocarbons ne basic heterocyclic compounds. alogen derivatives of hydrocarbons. ydroxy compounds and their derivatives. arbonyl compounds and their derivatives. arboxylic acids and their derivatives. rganic nitrogen compounds. rganic sulfur compounds.
Recommended litera M. Zikmund: Ako tvo A. Sirota, E. Adamko Heger, J., Hnát, I., Pu Putala, M., Sališová, Course language:	nture: oriť názvy v anorganickej chémii, SPN 1995. ovič, Názvoslovie anorganických látok, SPN, Bratislava, 2003. ntala, M.: Názvoslovie organických zlúčenín, SPN, Bratislava, 2004. M., Vencel, T.: Názvoslovie organických zlúčenín, Bratislava, 2015.

slovak language						
Notes:						
Course assessment Total number of assessed students: 648						
А	В	С	D	Е	FX	
21.76	31.17	25.15	10.34	2.47	9.1	
Provides: RNDr. Jana Špaková Raschmanová, PhD., Mgr. Michaela Rendošová, PhD.						
Date of last modification: 21.11.2021						
Approved: doc	. RNDr. Ivan Pot	očňák, PhD.				

University: P. J.	University: P. J. Šafárik University in Košice							
Faculty: Faculty	Faculty: Faculty of Science							
Course ID: CJP PFAJKKA/07	Course na	Course name: Communicative Competence in English						
Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present								
Number of EC	FS credits: 2							
Recommended	semester/trimes	ster of the cours	e:					
Course level: I.								
Prerequisities:								
Prerequisities: Conditions for course completion: Active participation in class and completed homework assignments. Students are allowed to miss two classes at the most. 2 credit tests (presumably in weeks 6/7 and 12/13) and an oral presentation in English. Final evaluation consists of the scores obtained for the 2 tests (50%) and the presentation (50%). Final grade will be calculated as follows: A 93-100 %, B 86-92%, C 79-85%, D 72-78%, E 65-71%, FX 64 % and less. Learning outcomes: Brief outline of the course: Recommended literature: www.bbclearningenglish.com Štěpánek, Libor a kol. Academic English-Akademická angličtina. Praha: Grada Publishing, a.s., 2011. McCarthy M., O'Dell F.: English Vocabulary in Use, Upper-Intermediate. CUP, 1994. Fictumova J., Ceccarelli J., Long T.: Angličtina, konverzace pro pokročilé. Barrister and Principal, 2008. Peters S., Gráf T.: Time to practise. Polyglot, 2007. Jones L.: Communicative Grammar Practice. CUP, 1985. Additional tudy unstable								
Course language: English language, B2-C1 level according to CEFR								
Notes:								
Course assessment Total number of assessed students: 299								
А	В	С	D	Е	FX			
45.48	20.74	17.39	7.69	6.02	2.68			
Provides: Mgr. Ivana Kupková, PhD.								

Date of last modification: 11.02.2024

University: P. J. Šafár	rik University in Košice
Faculty: Faculty of S	cience
Course ID: CJP/ PFAJGA/07	Course name: Communicative Grammar in English
Course type, scope a Course type: Practic Recommended cour Per week: 2 Per stu Course method: pre	nd the method: ce rse-load (hours): dy period: 28 esent
Number of ECTS cro	edits: 2
Recommended seme	ster/trimester of the course:
Course level: I.	
Prerequisities:	
Conditions for cours Active classroom part by given deadlines. Powerpoint presentat Final Test - end of ser Final assessment = av Grading scale: A 93-	e completion: icipation (maximum 2 absences tolerated), homework assignments completed ion of a topic related to the study field. mester, no retake verage of test and presentation. 100%, B 86-92%, C 79-85%, D 72-78%, E 65-71%, FX 64% and less
Learning outcomes: The development of s of their communica phonological, lexical efectively use the lan level B2.	students' language skills - reading, writing, listening, speaking, improvement ative linguistic competence. Students acquire knowledge of selected and syntactic aspects, development of pragmatic competence. Students can guage for a given purpose, with focus on Academic English and English on
Brief outline of the c Selected aspects of E Word formation Contrast of tenses in T The passive voice Types of Conditionals Phrasal verbs and Eng Words order and colle	ourse: nglish grammar and pronunciation English s glish idioms ocations, prepositional phrases
Recommended litera Vince M.: Macmillan McCarthy, O'Dell: Er www.linguahouse.con esllibrary.com bbclearningenglish.co ted.com/talks Course language:	ture: Grammar in Context, Macmillan, 2008 nglish Vocabulary in Use, CUP, 1994 m

English langua	ge, level B2 acco	rding to CEFR.					
Notes:							
Course assessn Total number o	nent f assessed studen	ts: 446					
А	B C D E FX						
41.48	41.48 19.51 15.7 7.85 5.61 9.87						
Provides: Mgr. Lenka Klimčáková							
Date of last modification: 20.09.2023							
Approved: doc. RNDr. Ivan Potočňák, PhD.							

University: P. J. Šafárik University in Košice						
Faculty: Faculty of Science						
Course ID: KGER/ Course name: Communicative Grammar in German Language NJKG/07 Visite Communicative Grammar in German Language						
Course type, scope an Course type: Practic Recommended cour Per week: 2 Per stu Course method: pre Number of ECTS cro	Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present					

Recommended semester/trimester of the course:

Course level: I.

Prerequisities:

Conditions for course completion:

Active participation in class and completed homework assignments. Students are allowed to miss 2 classes at the most (2x90 min.). 2 control tests during the semester. Final grade will be calculated as follows: A 93-100 %, B 86-92%, C 79-85%, D 72-78%, E 65-71%, FX 64 % and less.

Learning outcomes:

The aim of the course is to identify and eliminate the most frequent grammatical errors in oral and written communication, learning language skills of listening comprehension, speaking, reading and writing, increasing students 'language competence (acquisition of selected phonological, lexical and syntactic knowledge), development of students' pragmatic competence (acquisition of the ability to express selected language functions), development of presentation skills, etc.

Brief outline of the course:

The course is aimed at practicing and consolidating knowledge of morphology and syntax of German in order to show the context in grammar as a whole. The course is intended for students who often make grammatical errors in oral as well as written communication. Through the analysis of texts, audio recordings, tests, grammar exercises, monologic and dialogical expressions of students focused on specific grammatical structures, problematic cases are solved individually and in groups. Emphasis is placed on the balanced development of grammatical thinking in the communication process, which ultimately contributes to the development of all four language skills.

Recommended literature:

Dreyer, H. – Schmitt, R.: Lehr- und Übungsbuch der deutschen Grammatik. Hueber Verlag GmbH & Co. Ismaning, 2009.

Krüger, M.: Motive Kursbuch, Lektion 1 – 30. Huebert Verlag GmbH & Co. Ismaning, 2020. Brill, L.M. – Techmer, M.: Deutsch. Großes Übungsbuch. Wortschatz. Huebert Verlag GmbH & Co. Ismaning, 2011.

Földeak, Hans: Sag's besser!. Grammatik. Arbeitsbuch für Fortgeschrittene. Huebert Verlag GmbH & Co. Ismaning, 2001.

Geiger, S. – Dinsel, S.: Deutsch Übungsbuch Grammatik A2-B2. Huebert Verlag GmbH & Co. Ismaning, 2018.

Dittelová, E. – Zavatčanová, M.: Einführung in das Studium der deutschen Fachsprache. Košice: ES UPJŠ, 2000.

Course langua German, Slova	ge: k language						
Notes:	Notes:						
Course assessn Total number o	nent f assessed studen	ts: 57					
А	В	С	D	Е	FX		
61.4	61.4 10.53 8.77 3.51 8.77 7.02						
Provides: Mgr.	Ulrika Strömplov	vá, PhD.					
Date of last modification: 12.07.2022							
Approved: doc	. RNDr. Ivan Pote	očňák, PhD.					

University: P. J. Safá	rik Univers	sity in Košice				
Faculty: Faculty of S	science					
Course ID: ÚBEV/ CYTCH/22	ourse ID: ÚBEV/ Course name: Cytology for Chemists YTCH/22					
Course type, scope a Course type: Lectu Recommended cou Per week: 3 Per stu Course method: pro-	ind the me re rse-load (h idy period: esent	thod: ours): 42				
Number of ECTS cr	edits: 4					
Recommended seme	ester/trimes	ster of the cours	e: 1.			
Course level: I.						
Prerequisities:						
Conditions for courses Successful completit	se completi	i on: tests from the cor	ntent of lectures.	Written examina	tion.	
Learning outcomes: To get acquainted of structure of eukaryot cellular components.	chemistry s ic cells and	tudents with the r l the relationship	nicroscopic, sub between the stru	microscopic and pucture and function	partly molecular on of individual	
Lectures: 1.) Cell theory. Cell of substances across Extracellular matrix nucleus. 10.) Mitoch Endoplasmic reticulu Pathological changes	2.) Organi membran Cell mov ondria and um. Golgi a in cells.	ization of living es. 5.) Cell wall ement. 7.) Inter- cellular metabol apparatus. Lysose	systems. 3.) Bio l of plant cells. cellular connect ism. 11.) Plastid omes. 13.) Diffe	logical membran 6.) Surface stru ions. 8.) Cytosk s and vacuoles. 1 crentiation, aging	tes. 4.) Transfer actures of cells. eleton. 9.) Cell (2.) Ribosomes. and cell death.	
Recommended litera K.Kapeller, H.Strake M.Babák, J.Šamaj: C Alberts B., Bray D., Campbell N. a Reece Kleban J., Mikeš J., praktické cvičenia, 2	ature: Ie: Cytomo Ytológia. U Johnson A. J.: Biologi Jendželovsk 018	rfológia. Osveta Iniverzita Komer , Lewis J.: Zákla ie. Computer Pres cá Z., Jendželovs	Martin, 1999 Iského Bratislava dy buněčné biolo ss, 2006 ký R., Fedoročko	a, 2002 ogie. Espero Publ o P.: Cytológia pr	ishing, 2003 racovný zošit na	
Course language:						
Notes:						
Course assessment Total number of asse	ssed studen	its: 58				
A	В	С	D	Е	FX	
0.0	12.07	10.34	32.76	41.38	3.45	

Provides: doc. RNDr. Rastislav Jendželovský, PhD.

Date of last modification: 19.02.2024

University: P. J. Šafá	rik University in Košice						
Faculty: Faculty of S	Faculty: Faculty of Science						
Course ID: CJP/ PFAJ4/07	Course name: English Language of Natural Science						
Course type, scope a Course type: Practic Recommended cou Per week: 2 Per stu Course method: pre	and the method: ce rse-load (hours): ady period: 28 esent						
Number of ECTS cr	redits: 2						
Recommended seme	ester/trimester of the course: 2., 4.						
Course level: I.							
Prerequisities:							
Conditions for course Active participation is 2 classes at the most Continuous assessme 1 credit test taken pro 1 project (quiz on the 5 LMS quizzes (25%) In order to be admitte assessment The exam test results represent the other 50 The final grade for the A 93-100, B 86-92, C Learning outcomes:	se completion: in class and completed homework assignments. Students are allowed to miss ent: esumably in weeks 6/7 e topic of the student's field of study) 25% of the continuous assessment o of the continuous assessment) ed to the final exam, a student has to score at least 65 % from the continuous represent 50% of the final grade for the course, continuous assessment results 0% of the final grade. he course will be calculated as follows: C 79-85, D 72-78, E 65-71, FX 64 and less.						
Enhancement of stud in English for specific Students obtain know English, improve their purpose, and acquire sciences.	ents' language skills (speaking, writing, reading and listening comprehension) c and academic purposes and development of students' linguistic competence. vledge of selected phonological, lexical and syntactic aspects of professional ir pragmatic competence - students can effectively use the language for a given presentation skills at B2 level (CEFR) with focus on terminology of natural						
 Brief outline of the c 1. Introduction to stu 2. Selected aspects of 3. Talking about acade 4. Discussing science 5. Defining scientifice 6. Expressing cause a 7. Describing structu 8. Explaining process 9. Comparing objects 	course: dying language f scientific language demic study e terminology and concepts and effect res ses ses s, 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.

Recommended literature:

lms.upjs.sk - e-kurz Odborný anglický jazyk pre prírodné vedy.

Redman, S.: English Vocabulary in Use, Pre-intermetdiate, 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.

https://worldservice/learningenglish, https://spectator.sme.sk

www.isllibrary.com

linguahouse.com

Course language:

English, level B2 (CEFR)

Notes:

Course assessment

Total number of assessed students: 3075

А	В	С	D	Е	FX	
38.44	26.08	16.46	9.53	7.45	2.05	
Provides: Mgr. Viktória Mária Slovenská, Mgr. Lenka Klimčáková						
Date of last modification: 06.02.2024						

Faculty: Faculty of Science

Course ID: ÚCHV/	Course name: Environmental Chemistry
ECH1/08	

Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours):

Per week: 2 / 1 **Per study period:** 28 / 14

Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities:

Conditions for course completion:

Continuous evaluation of exercise preparation and accepted exercise protocols. Active participation in exercises. Passing the final examination in the form of a written test.

Learning outcomes:

Providing basic principles and knowledge of environmental chemistry.

Brief outline of the course:

The subject of environmental chemistry. Matter cycles on Earth. Geochemical cycles. Carbon, nitrogen, sulphur, phospohorous cycles. Metals and environment. Special cycles. Earth atmosphere composition, functions of atmosphere. Physical and chemical processes in atmosphere. Atmospheric photochemistry. Pollutants in atmosphere and greenhouse effect. Models of greenhouse effects. Principles of air quality control. Energetic Earth balance. Water environment and pollutants monitored. Classification of pollutants and ways of elimination. Waste water cleaning processes. Analytical methods in environmental chemistry, applications. Soil analysis, biogeochemical processes. Acid rain, metal ions in soil. Environmental analysis, strategy and concepts.

Recommended literature:

G. Schwedt: The Essential Guide to Environmental Chemistry, Wiley and Sons, London 2001
 R.N. Reeve, J.D. Barnes: General Environmental Chemistry, Wiley, London 1994

Course language:

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: 79								
A B C D E FX								
69.62	69.62 20.25 5.06 2.53 2.53 0.0							
Provides: doc. RNDr. Andrea Straková Fedorková, PhD.								
Date of last modification: 18.11.2021								
Approved: doc. RNDr. Ivan Potočňák, PhD.								

Faculty: Faculty of Science

Course ID: ÚCHV/ **Course name:** Fundamentals of Bioanalytical Chemistry BACHZ/06

Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours):

Per week: 2 / 1 **Per study period:** 28 / 14

Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities:

Conditions for course completion:

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.

Learning outcomes:

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.

Brief outline of the course:

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.

Recommended literature:

1. Chromý, V. a kol.: Bioanalytika, MU Brno, 2002

2. Kukačka, J. a kol.: Bioanalytická chemie v príkladech 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

Course language:

Notes:

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: 108								
A B C D E FX								
33.33	33.33 30.56 30.56 4.63 0.0 0.93							
Provides: doc. RNDr. Katarína Reiffová, PhD.								
Date of last modification: 22.07.2022								
Approved: doc. RNDr. Ivan Potočňák, PhD.								

University: P. J. Šafár	ik University in Košice
Faculty: Faculty of Sc	cience
Course ID: ÚCHV/ VCH/10	Course name: General Chemistry
Course type, scope an Course type: Lecture Recommended cour Per week: 4 / 4 Per s Course method: pres	nd the method: e / Practice rse-load (hours): study period: 56 / 56 sent
Number of ECTS cre	edits: 10
Recommended semes	ster/trimester of the course: 1.
Course level: I.	
Prerequisities: ÚCHV	//PRCH1/10
to correct unsuccessful 5 points, 81-90% (B) point, less than 51% (Three tests are writter to correct unsuccessful obtain at least 51% of Oral examination.	ally written tests. Each of the tests is evaluated as follows: $91-100\%$ (A) = = 4 points, $71-80\%$ (C) = 3 points, $61-70\%$ (D) = 2 points, $51-60\%$ (E) = 1 FX) = 0 point. Student must obtain together at least 2 points. In during the semester. Writing of the tests is mandatory and it is not possible ally written tests. Each of the tests is evaluated as a percentage. Student must fat least one test.
Learning outcomes: To provide students w and compounds.	with knowledge about atoms, chemical bonds, physical properties of elements
Brief outline of the co Main terms used in periodicity and its e intermolecular interac Solutions. Chemical Classification of chem	Durse: chemistry. Atoms – models of atoms, electron configuration, chemical effect on the properties of elements, radioactivity. Chemical bonds and etions. Chemical structure and physical properties of matter. States of matter equilibrium. Basis of chemical thermodynamics and chemical kinetics nical reactions. Electrochemistry.
Recommended literat Atkins P., Jones L.: Cl Russel J.B.: General C Available literature in	ture: hemical Principles, 2nd ed., Freeman, New York 2002. Chemistry, 2nd ed., McGraw Hill, London 1992. the library.
Course language:	

Slovak and English

Notes:

Course assessment Total number of assessed students: 834								
ABCDEFX								
11.03	11.03 23.62 31.77 17.75 10.31 5.52							
Provides: doc. RNDr. Ivan Potočňák, PhD., doc. RNDr. Juraj Kuchár, PhD.								
Date of last modification: 21.09.2021								
Approved: doc	Approved: doc. RNDr. Ivan Potočňák, PhD.							

Univ	vers	ity:	P. J.	Šafár	ik	University in Košice	
_	-	-		2 ~			

Faculty: Faculty of Science

Course ID: ÚCHV/	Course name: General Chemistry
VCH/21	

Course type, scope and the method: Course type: Lecture / Practice

Recommended course-load (hours): Per week: 4 / 4 **Per study period:** 56 / 56

Course method: present

Number of ECTS credits: 9

Recommended semester/trimester of the course: 1.

Course level: I.

Prerequisities: ÚCHV/PRCH1/10

Conditions for course completion:

Three tests are written during the semester. Writing of the tests is mandatory and it is not possible to correct unsuccessfully written tests. Each of the tests is evaluated as follows: 91-100% (A) = 5 points, 81-90% (B) = 4 points, 71-80% (C) = 3 points, 61-70% (D) = 2 points, 51-60% (E) = 1 point, less than 51% (FX) = 0 point. In order to be admitted to the oral exam at the end of the semester, a student must obtain at least 2 points from the tests. Oral examination consists of 3 questions. A student must obtain at least 51 % from each question.

Learning outcomes:

After completing the subject, the student will gain knowledge about atoms, chemical bonds, physical and chemical properties of elements and compounds. He will understand the basics of chemical thermodynamics and its influence on the course of chemical reactions.

Brief outline of the course:

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. States of matter. Solutions. Chemical equilibrium. Basis of chemical thermodynamics and chemical kinetics. Classification of chemical reactions. Basis o electrochemistry.

Recommended literature:

- 1. Atkins P., Jones L.: Chemical Principles, 2nd ed., Freeman, New York 2002.
- 2. Petrucci R.H. at al.: General Chemistry, 10th ed., Pearson, Toronto 2011.
- 3. Russel J.B.: General Chemistry, 2nd ed., McGraw Hill, London 1992.
- 4. Available literature in the library.

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: 537								
A B C D E FX								
12.48	12.48 27.0 31.28 16.39 8.57 4.28							
Provides: doc. RNDr. Ivan Potočňák, PhD., doc. RNDr. Juraj Kuchár, PhD.								
Date of last modification: 21.07.2022								
Approved: doc	Approved: doc. RNDr. Ivan Potočňák, PhD.							

	COURSE INFORMATION LETTER
University: P. J. Šafár	rik University in Košice
Faculty: Faculty of So	zience
Course ID: ÚCHV/ GAC/21	Course name: Green analytical chemisty and automatization
Course type, scope an Course type: Lectur Recommended cour Per week: 2 / 1 Per s Course method: pre	nd the method: e / Practice rse-load (hours): study period: 28 / 14 sent
Number of ECTS cre	edits: 5
Recommended semes	ster/trimester of the course: 5.
Course level: I.	
Prerequisities:	
Elaboration of 2 writt participation in the exa is carried out by a com with an examination of Note: Detailed condit (LMS UPJŠ).	ten assignments (or subject project), which will be one of the conditions for am. The evaluation of the student's study results within the study of the subject abination of continuous control during the teaching part of the semester (50%) during the examination period (50%). tions are updated annually within the repository for digital support materials
Learning outcomes: The student acquires analytical chemistry.	s knowledge of the green chemistry, miniaturization, and automation in
Brief outline of the co Green chemistry. Pri instrumental techniq of miniaturization an applications of proceed	burse: inciples of green chemistry. Green Analytical Chemistry (GAC). Green ues. Miniaturization and automation. Principles of individual methods nd automation, instrumentation, advantages and disadvantages. Practical dures.
Recommended litera 1. J. Labuda a kol. Ar 2. Current periodical 3. ANASTAS, P., WA University Press. 199 4. KOLEV S.D., Mck Elsevier Wilson&Wil	ture: nalytická chémia, STU, Bratislava 2014. literature. IRNER J. C. Green Chemistry: Theory and Practice. Oxford: Oxford 8. KELVIE I.D. Advences in flow injection analysis and related techniqoues. son's, USA, 2008.
Course language: Slovak	
Notes:	anted by full time or if near game distance method using the MS Teams or

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.

Course assessment Total number of assessed students: 0								
ABCDEFX								
0.0	0.0 0.0 0.0 0.0 0.0 0.0							
Provides: prof. Mgr. Vasil' Andruch, DSc., RNDr. Jana Šandrejová, PhD., univerzitná docentka								
Date of last modification: 22.07.2022								
Approved: doc. RNDr. Ivan Potočňák, PhD.								

NIDSE INFODMATION I ETTED

COURSE INFORMATION LETTER						
University: P. J. Šafárik University in Košice						
Faculty: Faculty of Science						
Course ID: ÚCHV/ ACPE1/03Course name: Industrial Ecology						
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 2 / 1 Per study period: 28 / 14 Course method: present						
Number of ECTS credits: 5						
Recommended semester/trimester of the course: 5.						
Course level: I.						
Prerequisities:						
On the basis of an interim assessment that is higher than 51%: during the semester, 4 mid-term tests are written, and it is also mandatory to prepare and present one seminar work on the given topic. In order to be admitted to the exam, the evaluation of the interim tests together with the evaluation of the seminar work must be higher than 51%. The exam consists of a written and an oral part and its overall percentage rating must be higher than 51%. (Written and oral exam evaluation: 51-60% - E; 61-70% - D; 71-80% - C; 81-90% - B; 91-100% - A). Learning outcomes: After completing the subject, the student will acquire knowledge in the field of industrial ecology and environmental chemistry of all abiotic components of the environment (in the context of industrial ecology).						
Brief outline of the course: Familiarization with the concept of industrial ecology and its use in environmental protection and the development of green technologies. Selected topics of environmental chemistry (environmental chemistry of all abiotic components of the environment - environmental chemistry of atmosphere, hydrosphere, pedosphere and part of the geosphere: the earth's crust) in the context of industrial ecology. Selected topics of industrial, clinical toxicology and ecotoxicology in the context of industrial ecology.						
 Recommended literature: S. E. Manahan: Industrial Ecology., CRC Press, New York, 1999. S. E. Manahan: Environmental Chemistry., CRC Press, New York, 2005. R. U. Ayres, L. Ayres: A handbook of industrial ecology, Edward Elgar Publishing, 2002. 						
Course language: Slovak language						

Teaching can also be carried out by distance learning, using MS Teams or BBB. The form of teaching is always specified at the beginning of the semester, and is continuously updated in accordance with the pandemic situation.

Course assessment Total number of assessed students: 167							
A B C D E FX							
25.75	25.75 20.96 25.75 14.97 11.98 0.6						
Provides: doc. Ing. Viera Vojteková, PhD.							
Date of last modification: 03.08.2022							
Approved: doc. RNDr. Ivan Potočňák, PhD.							

University: P. J. Šafárik University in Košice						
Faculty: Faculty of Science						
Course ID: ÚCHV/ ISVTC/14	rse ID: ÚCHV/ Course name: Information Systems and Computational Technics in Chemistry					
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 0 / 4 Per study period: 0 / 56 Course method: present						
Number of ECTS cr	edits: 4					
Recommended semester/trimester of the course: 1.						
Course level: I.						
Prerequisities:						

Conditions for course completion:

In order to pass this course, each student must complete ALL of the following compulsory requirements: Students may only miss 1 session. Students must demonstrate the ability to work with electronic information sources available within the licenced access of the University library and must submit all assignments (10). Students must complete: 4 assignments using scientometric database Scopus and Web of Science; 2 assignments using factual database ChemSpider or other available factual database; 6 assignments using software ACDLabs/ChemSketch, respectively other possible editor of chemical structures. Students are assigned a grade in the course on the basis of submitted assignments. Students must obtain at least 51 percent of the total number of points within all submitted assignments. Students are assigned a grade in the course as follows: 100 - 91% (A), 90 - 81% (B), 80 - 71% (C), 70 - 61% (D), 60 - 51% (E), 50% and less FX. The examination can be extended to written and/or oral examination as the examiner may determine.

Learning outcomes:

Introductory course aimed at introducing students to the fundamental informatics techniques for chemistry-related disciplines. The class will cover a wide range of topics, including searching chemical information on internet, searching for patent information and work with the primary and secondary literature. Another objective of the course is to teach students basic computer skills.

Brief outline of the course:

Searching, retrieving and use of the informations in chemistry. Using of "paper" resources (primary journals). Searching chemical information on Internet and chemical databases and e-journals. Basic skills in using a text editor, creating spreadsheets and presentations, as well as searching for information using the internet.

Recommended literature:

 Maizell R.E.: How to find chemical information, J. Wiley & Sons, 1998
 Ash J.E.: Communication storage and retrieval of chemical information, Clichester Ellis Ylorwood 1985
 Internet resources for subject.
 Franců M: Jak zuládnout testy ECDL. Proha : Computer Pross. 2007, 160 s. ISBN.

2. Franců, M: Jak zvládnout testy ECDL. Praha : Computer Press. 2007. 160 s. ISBN 978-80-251-1485-8

3. Jančařík, A. et al.: S počítačem do Evropy – ECDL. 2. vydanie. Praha : Computer Press, 2007. 152 s. ISBN 80-251-1844-3

Course language:

Slovak and English

Notes:

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.

Course assessment

Total number of assessed students: 297

А	В	С	D	Е	FX
93.94	3.7	0.34	0.34	0.0	1.68

Provides: RNDr. Monika Tvrdoňová, PhD., doc. RNDr. Ladislav Janovec, PhD.

Date of last modification: 04.08.2022

Faculty: Faculty of Science

Course ID: ÚCHV/	Course name: Inorganic Chemistry II
ACH2/03	

Course type, scope and the method: Course type: Lecture / Practice

Recommended course-load (hours): Per week: 3 / 2 Per study period: 42 / 28

Course method: present

Number of ECTS credits: 7

Recommended semester/trimester of the course: 3.

Course level: I.

Prerequisities: ÚCHV/ACH1/10 or ÚCHV/ACHU/03

Conditions for course completion:

Written examination at the end of the course. The final mark is given by the sum of points from seminars (max. 10 points) and 3x30 points from written test, totally 100 points. To pass it is required to obtain at least 51 points as well as 51 % of points from every partial examination.

Learning outcomes:

Goal of the course is to provide the students with a knowledge of systematic chemistry of metallic elements.

Brief outline of the course:

Electronic configuration, abundance, use, physical and chemical properties and reactivity of the elements of the 1st, 2nd groups, transition metal elements, elements of the 12th group, Al, Ga, In, Tl, Ge, Sn, Pb, As, Sb, Bi, Se, Te, Po, lanthanides and actinides. Binary and other compounds formed by these elements, their properties and reactivity. General properties, structure and bonding in metals, co-ordination and organometallic compounds.

Recommended literature:

 Greenwood, N. N., Earnshaw, A: Chemistry of the Elements. Pergamon Press, Oxford, 1984
 Shriver, D.F., Atkins, P.W., Langford, C. H.: Inorganic Chemistry. 2ndEd., Oxford University Press, Oxford, 1995

Course language:

Notes:

Course assessment

Total number of assessed students: 685

А	В	С	D	Е	FX
13.14	21.9	29.78	23.94	6.86	4.38

Provides: prof. RNDr. Juraj Černák, DrSc., RNDr. Miroslava Matiková Maľarová, PhD.

Date of last modification: 03.05.2015

University: P. J. Safárik	Cuniversity in Košice
----------------------------------	-----------------------

Faculty: Faculty of Science

Course ID: ÚCHV/	Course name: Inorganic Chemistry II			
ACH2/21				

Course type, scope and the method:

Course type: Lecture / Practice

Recommended course-load (hours): Per week: 3 / 2 **Per study period:** 42 / 28

Course method: present

Number of ECTS credits: 6

Recommended semester/trimester of the course: 3.

Course level: I.

Prerequisities: ÚCHV/ACH1/10 or ÚCHV/ACHU/21 or ÚCHV/ACHU/03

Conditions for course completion:

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 (illnes, 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.

Learning outcomes:

To acquire knowledge about physical and chemical properties of metallic elements and their compounds.

Brief outline of the course:

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.

Recommended literature:

Greenwood, N.N., Earnshaw, A.: Chemistry of the elements, Pergamon Press N.Y., 1984.
 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: 29

А	В	С	D	Е	FX
13.79	24.14	44.83	10.34	3.45	3.45

Provides: prof. RNDr. Juraj Černák, DrSc., prof. RNDr. Vladimír Zeleňák, DrSc., RNDr. Miroslava Matiková Maľarová, PhD.

Date of last modification: 16.11.2021
Faculty: Faculty of Science

Course ID: ÚCHV/	Course name: Inorganic chemistry
ACH1/10	

Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours):

Per week: 2 / 2 Per study period: 28 / 28

Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 2.

Course level: I.

Prerequisities: ÚCHV/VCH/10 or ÚCHV/VCH/21 or ÚCHV/VCHU/10 or ÚCHV/VCHU/15

Conditions for course completion:

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 (illnes, 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 (written test, of which 1 test during the semester) with the possibility of further oral examination, or, in case of restrictions of contact forms of the pedagogical process, 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.

Learning outcomes:

Aim of the course is to provide the students with a knowledge of physical and chemical properties of non-metallic elements and their compounds.

Brief outline of the course:

Introduction to systematic inorganic chemistry, periodicity of properties of elements and compounds. Hydrogen. Halogens. Oxygen, oxygen compounds with hydrogen. Sulfur. Nitrogen. Phosphorus. Carbon. Silicon. Boron. Rare gases. Electronic configurations and bonding possibilities, properties of the element as a simple substance, its compounds (hydrides, halides, oxides and others), laboratory preparation and production, possibilities of practical use, natural raw materials.

Recommended literature:

1. Greenwood, N. N., Earnshaw, A: Chemistry of the Elements. Pergamon Press, Oxford, 1984

2. Shriver, D.F., Atkins, P.W., Langford, C. H.: Inorganic Chemistry. 4th Ed., Oxford University Press, Oxford, 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: 445

А	В	С	D	Е	FX
12.81	21.8	27.19	27.64	8.99	1.57

Provides: prof. RNDr. Juraj Černák, DrSc., RNDr. Miroslava Matiková Maľarová, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.

Date of last modification: 16.11.2021

University is J. Dalatik University in KUSICO	University:	P. J	Šafárik	University	in Košice
---	-------------	------	---------	------------	-----------

Faculty: Faculty of Science

Course ID: ÚCHV/ **Course name:** Instrumental Analytical Chemistry ANCH1b/21

Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours):

Per week: 2 / 2 **Per study period:** 28 / 28

Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 4.

Course level: I.

Prerequisities:

Conditions for course completion:

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).

Learning outcomes:

The student acquires knowledge of the theoretical foundations and instrumentation in analytical chemistry.

Brief outline of the course:

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.

Recommended literature:

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 Qualitation 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: 1

А	В	С	D	Е	FX
0.0	0.0	100.0	0.0	0.0	0.0

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

Date of last modification: 15.07.2022

University:	ΡJ	Šafárik	University	in Košice
Chirot Sity.	1.0.	Durunn	Oniversity	

Faculty: Faculty of Science

Course ID: ÚCHV/	Course name: Instrumental Analytical Chemistry
ANCH1b/03	

Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours):

Per week: 2 / 1 Per study period: 28 / 14

Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities:

Conditions for course completion:

Active participation in computational exercises; successful completion of the final test.

Elaboration of 2 written assignments (or project). The student is obliged to prepare 2 written assignments, which will be one of the conditions for participation in the exam.

Written test and oral examination during the examination period.

Note: Detailed conditions are updated annually within the repository for digital support materials (LMS UPJŠ).

Learning outcomes:

The student acquires knowledge of the theoretical foundations and instrumentation in analytical chemistry.

Brief outline of the course:

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.

Recommended literature:

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 Qualitation Analysis. D.C. Heath and Company 1988.

Course language:

Slovak, English

Notes:

Course assessment

Total number of assessed students: 623

А	В	С	D	Е	FX
19.9	13.16	22.47	19.26	24.88	0.32

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

Date of last modification: 22.07.2022

University: P. J. Šafá	rik University in Košice
Faculty: Faculty of S	cience
Course ID: ÚFV/ UVF/12	Course name: Introduction to General Physics for Chemist
Course type, scope a Course type: Practic Recommended cour Per week: 1 Per stu Course method: pre	nd the method: ce rse-load (hours): idy period: 14 esent
Number of ECTS cr	edits: 1
Recommended seme	ster/trimester of the course: 2.
Course level: I.	
Prerequisities:	
Conditions for course Knowledge of basic of student continuously numerical problems of the elaboration of two	completion: concepts from the fields of electricity, magnetism and optics is required. The acquires the curriculum during the semester, so that he can use them to solve during the exercise. The condition for successful completion of the course is o written tests and obtaining at least 50% of the total evaluation.
Learning outcomes: Acquire basic know supplement the know students who comple	ledge of electricity, magnetism and optics. The aim of the course is to vledge from the subject Physics II. The course is recommended for chemistry te the course ÚFV / CHF1b in a given school year.
Brief outline of the c 12. Week: Introduct strength. Week 3: Gauss's theo Week 4:. Conductor c 45. a week: . Ohm's Week 6: Work and po 79. week: Magnetic Week 10:. Ampere's Week 11: Electromag Week 12: Faraday's la	ourse: tion. Electrostatics. Forces in an electric field - Coulomb's law. Electric field orem. Electrostatic field work; potential, voltage. capacity, capacitors. Electric field energy. law, conductor resistance. Kirchhoff's laws. ower of electric current. e field. Magnetic field induction, Biott - Savart law. and Lorentz's force. gnetic induction - Faraday's law. aws on electrolysis.
Recommended litera V. Hajko a kol. Fyzik	i ture: a v príkladoch, Alfa, Bratislava, 1983.
Course language:	
Notes:	

Course assessment Total number of assessed students: 350				
abs n				
95.71 4.29				
Provides: Mgr. Tomáš Samuely, PhD., univerzitný docent, RNDr. Róbert Tarasenko, PhD.				
Date of last modification: 17.09.2021				
Approved: doc. RNDr. Ivan Potočňák, PhD.				

University: P. J. Šafá	rik University in Košice			
Faculty: Faculty of S	cience			
Course ID: ÚCHV/ FUMCH1/03Course name: Introduction to Material Chemistry				
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 2 / 1 Per study period: 28 / 14 Course method: present				
Number of ECTS credits: 5				
Recommended semester/trimester of the course: 5.				

Course level: I., II.

Prerequisities:

Conditions for course completion:

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 student's justified non-participation (incapacity for work, family reasons, etc.) in a maximum of two seminars during the semester without the need for substitute performance. In the case of a longer-term justified absence (for example due to incapacity for work), the relevant teacher will assign the student an alternative form of mastering the missed material.

2. Activity at seminars. The preparation of students and their activity in seminars is always assessed by the relevant teacher who leads the seminar, within his / her competence.

3. Elaboration and submission of a seminar paper on an assigned topic within the independent work at home and presentation of the most important conclusions of the seminar paper in the form of a PPT presentation. The seminar papers must be handed over to the relevant teacher who leads the seminars by the 12th week of the semester, and the presentation must take place no later than the 8th week of the semester. The seminar work and performance are evaluated by the relevant teacher. Submission of the seminar paper and its successful defense is a condition of admission to the oral exam.

4. The exam is usually carried out orally, resp. in case of restrictions of contact forms of the pedagogical process, the exam will be performed in a suitable distance - electronic form.

5. To successfully master the subject, it is necessary to prove mastery of the required curriculum at least 51%.

Learning outcomes:

To present the different types of functional materials, their atomic structure and mechanical properties.

Brief outline of the course:

Historical perspectives. Materials and human being. Participation of natural science in material engineering. Material revolutions. Classification of materials. Atomic structure and interatomic bonding. Amorphous and crystalline materials. Mechanics of materials. Imperfections in solids. Crystal lattice defects. Point defects. Line defects. Dislocations. Diffusion. Diffusion mechanisms. Deformations and failures, re-crystallization. Deformations. Plastic deformations. Solid solutions. Intermediary phases. Phases in ceramic systems. Phase transformations. Crystallization of metals.

Phase identification methods. Stress and strain. Structure of metallic and ceramic materials. Alloys. Steel. Light metals. Metallic glasses. Gold. Inorganic non-metallic materials. Ceramic construction materials. Ceramic tools. Bio-ceramics. Ceramics in cosmos. High-temperature superconductors. Glass. Building binders. Polymers. Essence of polymers. Thermoplastics. Reactoplastics. Polymer structure. Mechanical properties of polymers. Natural materials. Wood. Bones. Teeth. Conchs and shells. Tectrices.

Recommended literature:

W. D. Callister, Jr.: Fundamentals of Materials Science and Engineering, John Wiley & Sons, 2001.

Brian S. Mitchell: An Introduction to Materials Engineering and Science: For Chemical and Materials Engineers, John Wiley & Sons, 2004.

Course language:

Slovak language.

Notes:

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.

Course assessment Total number of assessed students: 81						
A B C D E FX						
90.12 8.64 0.0 0.0 0.0 1.23						
Provides: prof. RNDr. Renáta Oriňaková, DrSc.						
Date of last modification: 25.11.2021						
Approved: doc	. RNDr. Ivan Pot	očňák, PhD.				

University: P. J. Šafá	University: P. J. Šafárik University in Košice					
Faculty: Faculty of S	Faculty: Faculty of Science					
Course ID: Dek. PF UPJŠ/USPV/13	Course ID: Dek. PF Course name: Introduction to Study of Sciences					
Course type, scope a Course type: Lectur Recommended cour Per week: Per stud Course method: pre	Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: Per study period: 12s / 3d Course method: present					
Number of ECTS cr	edits: 2					
Recommended seme	ster/trimester of the cours	e: 1.				
Course level: I.						
Prerequisities:						
Conditions for cours	e completion:					
Learning outcomes:						
Brief outline of the c	ourse:					
Recommended litera	iture:					
Course language:						
Notes:						
Course assessment Total number of asses	Course assessment Total number of assessed students: 2196					
	abs n					
89.34 10.66						
Provides: doc. RNDr. Marián Kireš, PhD.						
Date of last modification: 30.08.2022						
Approved: doc. RNDr. Ivan Potočňák, PhD.						

University: P. J. Šafárik University in Košice						
Faculty: Faculty of S	cience					
Course ID: ÚMV/ MTCa/13	Course name: Mathematics I for chemists					
Course type, scope a Course type: Lectur Recommended cou Per week: 2 / 2 Per Course method: pre	Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 2 / 2 Per study period: 28 / 28 Course method: present					
Number of ECTS cr	edits: 6					
Recommended semester/trimester of the course: 1.						
Course level: I.	Course level: I.					
Prerequisities:						

Conditions for course completion:

To complete the course, it is necessary to demonstrate the acquirement of basic mathematical terms and the ability to solve problems from selected thematic units.

The evaluation of the subject is according to the results from the semester and in view of the results of the written final test. During the semester, students write tests at all seminars (together 20 points) and two extensive tests (together 50 points). It is necessary to obtain at least 28 points during the semester. Then students may write the exam. To pass the exam, it is necessary to obtain at least 12 points from the maximum number of 30 points. The scale for student evaluation is as follows: 100-80-A, 79-70-B, 69-60-C, 59-50-D, 49-40-E. If a student does not achieve the required minimal number of points from the exam test (12 points) and during the semester (together 28 points), he/ she is evaluated by FX.

Learning outcomes:

After completing the course, the student can use basic mathematical terms, can solve various equations and inequations, and is acquainted with basic mathematical knowledge from the differential and integral calculus, and is able to apply the theory in concrete excercises.

Brief outline of the course:

Week 1-6: Definition of function. Domain and range of functions. Elementary functions. Inverse functions. Compositions of functions.

Week 7 - 14: Limit of functions. Continuity of functions. Derivation and its geometric aplications. Indefinite integrals, basic methods of integration. Definite integral and its applications.

Recommended literature:

S. Lang: A First Course in Calculus, Springer Verlag, 1998

Course language:

Slovak

Notes:

Course assessment Total number of assessed students: 288								
A B C D E FX								
15.63	15.63 12.85 19.1 23.26 27.43 1.74							
Provides: RND	Provides: RNDr. Jana Borzová, PhD., RNDr. Barbora Klemová, RNDr. Diana Trellová							
Date of last modification: 16.09.2021								
Approved: doc. RNDr. Ivan Potočňák, PhD.								

	COURSE INFORMATION LETTER
University: P. J. Šafá	irik University in Košice
Faculty: Faculty of S	Science
Course ID: ÚMV/ MTCa/22	Course name: Mathematics I for chemists
Course type, scope a Course type: Lectu Recommended cou Per week: 2 / 2 Per Course method: pr	ind the method: re / Practice rse-load (hours): study period: 28 / 28 esent
Number of ECTS cr	redits: 5
Recommended seme	ester/trimester of the course: 1.
Course level: I.	
Prerequisities:	
and the ability to solution The evaluation of the of the written final te and two extensive te semester. Then stude 12 points from the m 100-80-A, 79-70-B, of number of points fro she is evaluated by F	ve problems from selected thematic units. subject is according to the results from the semester and in view of the results st. During the semester, students write tests at all seminars (together 20 points) sts (together 50 points). It is necessary to obtain at least 28 points during the ents may write the exam. To pass the exam, it is necessary to obtain at least naximum number of 30 points. The scale for student evaluation is as follows: 59-60-C, 59-50-D, 49-40-E. If a student does not achieve the required minimal on the exam test (12 points) and during the semester (together 28 points), he/ X.
Learning outcomes: After completing th equations and inequ differential and integ	e course, the student can use basic mathematical terms, can solve various lations, and is acquainted with basic mathematical knowledge from the gral calculus, and is able to apply the theory in concrete excercises.
Brief outline of the of Week 1-6: Definition functions. Compositi Week 7-14: Limit of Indefinite integrals, I	course: n of function. Domain and range of functions. Elementary functions. Inverse ions of functions. `functions. Continuity of functions. Derivation and its geometric aplications. basic methods of integration. Definite integral and its applications.
Recommended liter: Huťka, Benko, Ďurił D. Studenovská, T. M odbory, UPJŠ 2006 D. Studenovská, T. M S. Lang: A First Cou	ature: covič: Matematika, Alfa, Bratislava 1991 Aadaras, S. Mockovčiak: Zbierka úloh z matematiky pre nematematické Madaras: Matematika pre nematematické odbory, UPJŠ 2006 Irse in Calculus, Springer Verlag, 1998

Course language:

Slovak

Notes:

Course assessment								
		15. 040			r			
А	B C D E FX							
11.41	11.41 10.94 16.41 21.09 28.28 11.88							
Provides: RNDr. Jana Borzová, PhD., RNDr. Miriam Kleinová, Mgr. Miriama Kmeciková, RNDr. Monika Krišáková								
Date of last modification: 18.04.2022								
Approved: doc	Approved: doc. RNDr. Ivan Potočňák, PhD.							

University: P. J. Šafárik University in Košice						
Faculty: Faculty of S	Faculty: Faculty of Science					
Course ID: ÚMV/ MTCb/13	Course name: Mathematics II for chemists					
Course type, scope a Course type: Lectur Recommended cou Per week: 2 / 2 Per Course method: pre	Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 2 / 2 Per study period: 28 / 28 Course method: present					
Number of ECTS credits: 5						
Recommended semester/trimester of the course: 2.						
Course level: I.						
Prerequisities: ÚMV/MTCa/22						
Conditions for course completion:						

Mastering standard procedures for solving systems of linear equations. Understanding the concept of function of several variables, mastering the definitions of limit of function, partial derivation of a function, differential of a function, local and global extrema of a function and acquiring skills associated with their use in calculations focused mainly on functions of two variables. Mastering standard procedures for solving basic types of ordinary differential equations of the 1st order. Understanding the concept of infinite series and acquiring skills to use the basic criteria of convergence of number series for deciding on the convergence or divergence of number series. Assessment is given on the basis of a continuous assessment and a written exam, which also includes an oral exam. Ongoing evaluation:

Two tests during the semester - 32 p. Small written tests during the semester - 10 p. Solving homework - 4 p. Active participation in exercises - 4. p. An exam: Final test and oral exam - 30 p. Classification scale: A: 91 % - 100 %, B: 81 % - 90 %, C: 71 % - 80 %, D: 61 % - 70 %, E: 51 % - 60 %, FX: 0 % - 50 %.

Learning outcomes:

The student should be able to explain the basic concepts and gain skills in using standard procedures for solving systems of linear equations using matrices and determinants. The student will expand his knowledge of the function of one variable and master the concept of a function of several variables, and will be able to explain the definitions of function limit, partial derivation of a function, differential of a function, local and global extrema of a function and acquire knowledge and skills oriented mainly on the functions of two variables. The student will learn standard procedures for solving basic types of ordinary differential equations of the 1st order. He will be able to use the acquired knowledge about solving differential equations in modeling and solving problems derived from real situations. The student will gain skills to use the basic criteria of convergence of number series when deciding on the convergence or divergence of number series.

The student will be able to use the acquired knowledge and skills in creating a mathematical model and will learn to effectively use the commands of the mathematical program Maple for routine calculations and visualization for solving created model.

Brief outline of the course:

1. - 3. Systems of linear equations, matrices, determinants.

4. - 7. Functions of several variables, continuity and limit, partial derivatives, differential, local and global extrema of a function of two variables.

8. - 11. Modeling of relations between quantities using differential equations. Methods for solving ordinary differential equations of the 1st order.

12. - 13. Sequences, infinite number series, convergence criteria of infinite number series, infinite functional series, Taylor series.

Recommended literature:

Huťka, V., Benko, E., Ďurikovič, V.: Matematika, Alfa, Bratislava 1991.

Kluvánek, I., Mišík, L., Švec, M.: Matematika II, Bratislava, 1961.

Osička, J.: Matematika pro chemiky, Brno, 2004.

Došlá, Z.: Matematika pro chemiky, Masarykova univerzita, Brno, 2011.

Hughes-Hallett, D., et al.: Applied Calculus. John Wiley & Sons, Inc., 2010.

Rogers, R., C.: The Calculus of Several Variables. 2011.

Course language:

Slovak

Notes:

Course assessment

Total number of assessed students: 437

А	В	С	D	Е	FX
13.04	16.02	17.62	24.26	26.09	2.97

Provides: doc. RNDr. Stanislav Lukáč, PhD., Mgr. Miriama Kmeciková, RNDr. Barbora Hennelová

Date of last modification: 18.04.2022

	COURSE INFORMATION LETTER
University: P. J. Šafá	rik University in Košice
Faculty: Faculty of S	cience
Course ID: ÚCHV/ GLP/12	Course name: Methodology of experiment. Fundamentals.
Course type, scope a Course type: Lectur Recommended cour Per week: 2 / 1 Per Course method: pre	nd the method: re / Practice rse-load (hours): study period: 28 / 14 esent
Number of ECTS cr	edits: 5
Recommended seme	ster/trimester of the course: 4.
Course level: I.	
Prerequisities:	
Conditions for cours On the basis of ongo written project. In ord must be higher than 5 rating must be higher 71-80% - C; 81-90%	e completion: ing evaluation, which requires the elaboration of seminar works and a final der to be admitted to the exam, after summing up, the continuous evaluation 1%. The exam consists of a written and an oral part and its overall percentage r than 51%. (Written and oral exam evaluation: 51-60% - E; 61-70% - D; - B; 91-100% - A).
Learning outcomes: After completing the statistical evaluation of interpretation of the r the suitability of the c estimation of uncerta practice.	course, the student will acquire knowledge in the area of: of the results, esults and methods, chosen methods for analysis (or measurement), inties and validation of newly developed methods in research and laboratory
Brief outline of the c Introduction and basi The basic formulas us Distribution of the res of the precision, of ac Calibration in analyti Solving of the typical	ourse: cs of statistical evaluation of experimental results. sed in the processing of the results of the chemical and biological experiments. sults of measurements, measures of central tendency and spread. Assessment ccuracy, and reliability of the results. cal chemistry.
Recommended litera Brereton R. G.: Chen Harvey D.: Modern A J.N. Miller, J.C. Mille Limited, 2010	ture: nometrics, Wiley, 2003 Analytical Chemistry, McGraw-Hill, 2000 er: Statistics and Chemometrics for Analytical Chemistry, Pearson Education
Course language: English language	
Notes:	

Teaching can also be carried out by distance learning, using MS Teams or BBB. The form of teaching is always specified at the beginning of the semester, and is continuously updated in accordance with the pandemic situation.

Course assessment							
Total number o	f assessed studen	ts: 25					
A B C D E FX							
40.0) 24.0 16.0 0.0 20.0 0.0						
Provides: doc.	Provides: doc. Ing. Viera Vojteková, PhD.						
Date of last modification: 03.08.2022							
Approved: doc	Approved: doc. RNDr. Ivan Potočňák, PhD.						

University: P J	Šafárik Univers	sity in Košice						
Eagulty: Eagult								
Faculty: Facult	y of Science							
Course ID: UC	HV/ Course na	Course name: Modern laboratories of analytical chemistry						
MLAC/21								
Course type, sc	ope and the me	thod:						
Course type: 1 Recommended	Lecture / Practice	ours).						
Per week: 0 /	Per study neri	od: 0 / 14						
Course metho	d: present							
Number of EC	TS credits: 1							
Recommended	semester/trimes	ster of the cours	e: 4.					
Course level: I.								
Prerequisities:								
Conditions for	course completi	on:						
Learning outco	omes:							
Brief outline of	the course:							
Recommended	literature:							
Course languag	ge:							
Notes:								
Course assessm	nent							
Total number of	Total number of assessed students: 0							
Α	В	С	D	Е	FX			
0.0	0.0 0.0 0.0 0.0 0.0 0.0							
Provides: RNDr. Rastislav Serbin, PhD.								
Date of last mo	dification: 20.09	9.2021						
Approved: doc.	Approved: doc. RNDr. Ivan Potočňák, PhD.							

University: P. J. Šafá	University: P. J. Šafárik University in Košice					
Faculty: Faculty of S	Faculty: Faculty of Science					
Course ID: ÚCHV/ NANO/09 Course name: Nanotechnology						
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 2 / 1 Per study period: 28 / 14 Course method: present						
Number of ECTS cr	edits: 5					
Recommended semester/trimester of the course: 5.						
Course level: I.						
Prerequisities:						

Conditions for course completion:

1. Participation in seminars (also applies to the online form of teaching) and laboratory exercises. Students are required to attend seminars and laboratory exercises. The relevant teacher who leads the seminar or practical exercise will justify the student's justified non-participation (incapacity for work, family reasons, etc.) in a maximum of two seminars during the semester without the need for substitute performance. In the case of a longer-term justified absence (for example due to incapacity for work), the relevant teacher will assign the student an alternative form of mastering the missed material.

2. Activity at seminars and practical exercises. The preparation of students and their activity in seminars and exercises is always assessed by the relevant teacher who conducts the seminar or exercise, within his / her competence.

3. The exam is carried out in the form of a written test, resp. in case of restrictions of contact forms of the pedagogical process, the exam will be performed in a suitable distance - electronic form.

4. To successfully master the subject, it is necessary to prove mastery of the required curriculum at least 51%.

Learning outcomes:

To provide the students with basic knowledge of nanotechnology, nanomaterials as well as preparation and investigation methods. Discusses current and future nanotechnology applications in engineering, physics, chemistry, biology, electronics and computing, energy and medicine. The students will obtain first knowledge on nanotechnology as well about the funktions of nanostructured surfaces.

Brief outline of the course:

Properties of nanomaterials. Methods of preparation of thin layers and nanostructured surfaces. Methods of submicron-sized structures production. Nanodevices and chips. Methods of nanomaterials structure investigation. Nanodevices and chips. Nanofluidic systems in biology, medicine, energy storage and catalysis.

Recommended literature:

- 1. Nanotechnológie, A. Oriňák, R. Oriňáková, A. Fedorková, PF UPJŠ, 2012.
- 2. Introduction to Nanotechnology, C. Poole Jr., F.J. Owens, Wiley (2003).

3. Nanoelectronics and Nanosystems, Karl Goser, Peter Glosekotter, Jan Dienstuhl., Springer, 2004.

4. Nano: The Essentials: T. Pradeep. McGraw – Hill education – 2007.

5. Nanofabrication Towards Biomedical Applications, Techniques, Tools, Applications and Impact. 2005 - By Challa, S.S.R. Kumar, Josef Hormes, Carola Leuschaer. Wiley – VCH.

Course language:

Slovak language.

Notes:

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.

Course assessment

Total number of assessed students: 201

А	В	С	D	Е	FX	Ν	Р	
27.86	23.38	24.38	12.94	6.97	1.0	0.0	3.48	

Provides: doc. RNDr. Andrea Straková Fedorková, PhD., prof. RNDr. Andrej Oriňak, PhD., prof. RNDr. Renáta Oriňaková, DrSc.

Date of last modification: 25.07.2022

University: P. J.	Šafárik Univers	sity in Košice			
Faculty: Faculty	y of Science				
Course ID: ÚCHV/ Course name: Nanotechology II NATE/12					
Course type, sc Course type: I Recommended Per week: 2 / 1 Course metho	ope and the met Lecture / Practice I course-load (h Per study peri d: present	thod: c ours): od: 28 / 14			
Number of EC	ΓS credits: 4				
Recommended	semester/trimes	ster of the cours	e: 6.		
Course level: I.,	, II.				
Prerequisities:					
The exam is can of the pedagogic To successfully least 51%.	ried out in the fo cal process, the e master the subjo	orm of a written exam will be perf ect, it is necessar	test, resp. in case formed in a suital ty to prove maste	e of restrictions ble distance - ele ery of the require	of contact forms ectronic form. ed curriculum a
Learning outco To provide the nanomaterials advanced know microfluidistic.	mes: students with and processes. ledges forced on	basic knowledg In connection appliocation in	ge of inovative on Nanotechno energy productio	nanotechnology logy the stude on and storage, n	y, nanoproducts ents will obtair anocatalysis and
Brief outline of Types of nanost carbon nanoma electronics, bion nanotechnology	the course: ructures. Nanom aterials, inorgan medical nanomat	aterials and their nic nanomaterial terials. Nanotech	application: nan ls, composite n nology today and	oliquids, metalli anomaterals, ma d in the future. H	ic nanomaterials anomaterals fo Iealth hazards o
Recommended	literature:				
Course language Slovak language	;e: e.				
Notes: Teaching is carr The form of tea continuously.	ied out in persor ching is specifie	n or, if necessary, d by the teacher a	remotely using the beginning of the begi	the bbb or MS T of the semester,	eams tool. updated
Course assessm					
Tatal		4			
Total number of A	f assessed studen B	ts: 21	D	E	FX

Provides: prof. RNDr. Andrej Oriňak, PhD., prof. RNDr. Renáta Oriňaková, DrSc., doc. RNDr. Andrea Straková Fedorková, PhD.

Date of last modification: 25.07.2022

Γ ΙΝΕΛΟΜΑΤΙΛΝ Ι ΕΤΤΕΟ

	COUKSE INFORMATION LETTER				
University: P. J. Šafán	rik University in Košice				
Faculty: Faculty of Science					
Course ID: ÚCHV/ JCH1/04	Course name: Nuclear Chemistry				
Course type, scope a Course type: Lectur Recommended cour Per week: 2 / 1 Per Course method: pre	nd the method: re / Practice rse-load (hours): study period: 28 / 14 esent				
Number of ECTS cr	edits: 5				
Recommended seme	ster/trimester of the course: 6.				
Course level: I., II.					
Prerequisities:					
Realization of practic Elaboration of a proje Examination, each qu	exercises, without absence. ect on a selected topic and its presentation. testion must be answered at least 50%.				
Learning outcomes: Study of natural and reactions. Gaining ne and their use in techr effects of nuclear ra healthcare.	d artificial radioactivity, acquaintance with nuclear quantities and nuclear we knowledge about the preparation of radionuclides and labeled compounds nical practice and in general and physical chemistry. Overview of biological adiation and practical use of nuclear medicine and nuclear chemistry in				
Brief outline of the c Fundamentals of nuc Radioactivity and rad life period. Units of n registration of radiati dilution method, activ Nuclear power station	ourse: elear chemistry. Elementary particles. Nuclear core. Nuclides and isotopes. lioactive disintegration kinetics. Radioactive disintegration. Decay law. Half radioactivity. Nuclear reactions. Sources of nuclear radiation. Detection and ion. Nuclear chemical technology. Radioactive analytical methods. Isotopic vation analysis. Biological effects of the nuclear radiation. Nuclear medicine. n.				
Recommended litera G. R. Choppin, J. Ryc G. R. Choppin, J. O. Woburn, USA, Butter W. D. Ehmann, D. E. York, 1991. A. Vértes, I. Kiss: Nu	Ature: dberg: Nuclear Chemistry, Theory and Applications, Pergamon Press, 1980. Liljenzin, J. Rydberg: Radiochemistry and Nuclear Chemistry, 3rd edition, rworth-Heinemann, 2002. Vance: Radiochemistry and Nuclear Methods of Analysis, Wiley, New uclear Chemistry, Elsevier, 1987.				
Course language:					
Notes: Teaching is carried ou online, using the Bigl	ut in person. If a distance form is required, the lectures will take place BlueButton tool (https://bbb.science.upjs.sk/). Other conditions will be				

specified by the teacher.

Course assessment Total number of assessed students: 63					
A B C D E FX					
44.44	30.16	14.29	6.35	3.17	1.59
Provides: RNDr. Andrea Morovská Turoňová, PhD., RNDr. František Kaľavský, doc. RNDr. Andrea Straková Fedorková, PhD., RNDr. Jana Shepa, PhD.					
Date of last modification: 24.11.2021					
Approved: doc. RNDr. Ivan Potočňák, PhD.					

University: P. J. Šafá	University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science				
Course ID: ÚCHV/ Course name: Odborná prax OP/14				
Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: Per study period: 2t Course method: present				
Number of ECTS cr	edits: 2			
Recommended seme	ster/trimester of the cours	e:		
Course level: I.				
Prerequisities:				
Conditions for course completion:				
Learning outcomes:	Learning outcomes:			
Brief outline of the c	ourse:			
Recommended litera	iture:			
Course language:				
Notes:				
Course assessment Total number of asses	ssed students: 9			
	abs	n		
100.0 0.0				
Provides: prof. RNDr. Zuzana Vargová, Ph.D.				
Date of last modification: 28.10.2021				
Approved: doc. RNDr. Ivan Potočňák, PhD.				

University: P. J. Šafá	rik University in Košice			
Faculty: Faculty of S	cience			
Course ID: ÚCHV/ Course name: Odborná prax OP1/17				
Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: Per study period: 2t Course method: present				
Number of ECTS cr	edits: 2			
Recommended seme	ster/trimester of the cours	e:		
Course level: I.				
Prerequisities:				
Conditions for course completion:				
Learning outcomes:	Learning outcomes:			
Brief outline of the c	ourse:			
Recommended literature:				
Course language:				
Notes:				
Course assessment Total number of asses	ssed students: 7			
	abs	n		
100.0 0.0				
Provides: prof. RNDr. Zuzana Vargová, Ph.D.				
Date of last modification: 28.10.2021				
Approved: doc. RNDr. Ivan Potočňák, PhD.				

University: P. J. Safári	k Universitv	in Košice
--------------------------	--------------	-----------

Faculty: Faculty of Science

Course ID: ÚCHV/ **Course name:** Organic Chemistry I OCH1a/10

Course type, scope and the method: Course type: Lecture / Practice

Recommended course-load (hours): Per week: 3 / 2 Per study period: 42 / 28

Course method: present

Number of ECTS credits: 6

Recommended semester/trimester of the course: 2.

Course level: I.

Prerequisities:

Conditions for course completion:

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 from the test. 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.

Learning outcomes:

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.

Brief outline of the course:

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 Nucleophilie 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 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 Carboxylic Derivatives Natural products, Saccharides, Aminoacids, Biologically active compounds

Recommended literature:

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.

Course language:

anglický

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: 857

А	В	С	D	Е	FX
13.42	9.68	18.79	25.32	30.92	1.87
				<u>6</u> 1	

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

Date of last modification: 04.08.2022

University	P 1	I Šafárik	University	in Košice
University.	Г. Ј	J. Salalik	University	III KUSICE

Faculty: Faculty of Science

Course ID: ÚCHV/	Course name: Organic chemistry - Lab
POC1/03	

Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: 6 Per study period: 84

Course method: present

Number of ECTS credits: 6

Recommended semester/trimester of the course: 3.

Course level: I.

Prerequisities: ÚCHV/OCH1a/10

Conditions for course completion:

100% participation 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.

Learning outcomes:

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.

Brief outline of the course:

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.

- 1. Isolation and purification methods crystallization
- 2. Isolation and purification methods distillation
- 3. Preparation of ethyl acetate
- 4. Preparation of acetylsalicylic acid
- 5. Preparation of benzalaniline
- 6. Spectral methods in organic chemistry
- 7. Preparation of acetophenone oxime
- 8. Preparation of benzilic acid
- 9. Preparation of 4,5-diphenylimidazole
- 10. Isolation of caffeine from tea
- 11. Isolation of trimyristin from nutmeg

Recommended literature:

- 1. Handout with experimental procedures http://kekule.science.upjs.sk/pochu.
- 2. Organic chemistry lectures.

Course language:

Slovak or English					
Notes:					
Course assessm Total number o	nent f assessed studen	ts: 490			
A	B C D E FX				FX
50.61	50.61 30.41 13.06 4.29 0.82 0.82				
Provides: RNDr. Kvetoslava Stanková, PhD., RNDr. Jana Špaková Raschmanová, PhD., RNDr. Slávka Hamuľaková, PhD., univerzitná docentka, RNDr. Mariana Budovská, PhD., univerzitná docentka, RNDr. Ján Elečko, PhD.					
Date of last modification: 09.01.2022					
Approved: doc. RNDr. Ivan Potočňák, PhD.					

Faculty: Faculty of Science

Course ID: ÚCHV/	Course name: Organic chemistry II
OCH1b/03	

Course type, scope and the method: Course type: Lecture / Practice

Recommended course-load (hours): Per week: 3 / 2 **Per study period:** 42 / 28

Course method: present

Number of ECTS credits: 7

Recommended semester/trimester of the course: 3.

Course level: I.

Prerequisities:

Conditions for course completion:

Two tests at lecture in 7 and 14th week. Test max 50 points. At least 25 points required. Written exam, 100 points. At least 49% of points required.

Final evaluation: A 90-100 pts, B 80-89 pts, C 70-79 pts, D 60-69 pts, E 50-59 pts, FX 0-49 pts

Learning outcomes:

Second part of two-semester organic chemistry course.

Brief outline of the course:

Reaction Mechanisms, Mechanisms of Organic Reactions, Reactive Intermediates, Ionic Reactions Radical Reactions Bond Energy Reaction Energetics Activation Energy Reaction Rates and Kinetics Thermodynamic and Chemical Stability Aromaticity Benzene and Other Aromatic Compounds Fused Benzene Ring Compounds Other Aromatic Systems Factors Required for Aromaticity Stereoisomers Chirality and Symmetry Enantiomorphism Polarimetry Optical Activity Designating the Configuration of Stereogenic Centers The Sequence Rule for Assignment of Configurations to Stereogenic Carbons Compounds Having Two or More Stereogenic Centers Stereogenic Nitrogen Fischer Projection Formulas Aldehydes & Ketones Natural Products Synthetic Preparation Properties of Aldehydes & Ketones Reversible Addition Reactions Hydration & Hemiacetal Formation Acetal Formation Imine Formation Enamine Formation Cyanohydrin Formation Irreversible Addition Reactions Complex Metal Hydrides Organometallic Reagents Carbonyl Group Modification Wolff-Kishner Reduction Clemmensen Reduction Hydrogenolysis of Thioacetals Oxidations Reactions at the a-Carbon Mechanism of Electrophilic a-Substitution The Aldol Reaction Ambident Enolate Anions Alkylation of Enolate Anions Carboxylic Acids Natural Products Related Derivatives Preparation of Carboxylic Acids Reactions of Carboxylic Acids Salt Formation Substitution of Hydroxyl Hydrogen Substitution of the Hydroxyl Group Reduction & Oxidation Carboxylic Derivatives Reactions of Carboxylic Acid Derivatives Acyl Group Substitution Mechanism Reduction Catalytic Reduction Metal Hydride Reduction Diborane Reduction Reaction with Organometallic Reagents Reactions at the a Carbon Acidity of a C-H The Claisen Condensation Synthesis Applications Carbohydrates Glucose The Structure and Configuration of Glucose Anomeric Forms of Monosaccharides Glycosides Disaccharides Polysaccharides Lipids Fatty Acids Soaps & Detergents Fats & Oils Nucleic Acids Alkaloids Terpenes

Recommended literature:

1. on-line moodle.science.upjs.sk

2. Organic Chemistry, Clayden, Greeves Warren & Wothers, Oxford University Press, 2010

3. Organic Chemistry, Solomon, Willey, 2009

4. Organic chemistry, John McMurry, Sixth Edition, 2004, Brooks/Cole, a Thomson Learning Company, ISBN: 0534389996.

Course language:

Notes:

Course assessment

Total number of assessed students: 647

А	В	С	D	Е	FX
12.36	10.82	17.62	21.64	34.62	2.94

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

Date of last modification: 05.02.2021

University: P. J. Šafárik University in Košice
Faculty: Faculty of Science
Course ID: ÚCHV/ MOC1/00Course name: Organic reactions mechanisms
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 2 / 1 Per study period: 28 / 14 Course method: present
Number of ECTS credits: 5
Recommended semester/trimester of the course: 6.
Course level: I.
Prerequisities:
Conditions for course completion: Midterm exam (success rate min. 51%). End-of-semester Project. Final written exam (success rate min. 51%). Percentage rating: 100 - 91% (A), 90 - 81% (B), 80 - 71% (C), 70 - 61% (D), 60 - 51% (E), 50% and less FX. 20 p – Midterm exam. 10 p – End-of-semester Project. 70 p – Final written exam.
Learning outcomes: Understanding of the organic reactions mechanisms at the molecular level, and ability to devise the course of the organic reactions.
Brief outline of the course: Analysis of important reaction mechanisms of substitution (SN, SE, SR, SNi), addition (AdN, AdE, AdR) and elimination (E1, E2, Ei) reactions, molecular rearrangements and redox reactions. Reaction intermediates, acid-base properties. 1. Correct formulas and resonance forms. 2. Structure reactivity relationship. 3. Reaction intermediates. 4. Aliphatic nucleophilic substitutions, radical substitutions. 5. Aromatic nucleophilic substitutions, radical substitutions. 6. Electrophilic substitutions. 7. Additions. 8. Eliminations. 9. Pericyclic reactions. 10. Rearrangements. 11. Complex mechanisms of common reactions.
1. Writing Reaction Mechanisms in Organic Chemistry, Kenneth A. Savin, Academic Press, 2015.

2. March's advanced organic chemistry, March J., Smith, M. B.: John Wiley&Sons, 2001.

Course language:

slovak, english

Notes:

In-person course, alternatively online course using the BigBlueButton 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: 196

А	В	С	D	Е	FX			
50.51	23.98	17.86	5.61	1.53	0.51			
Provides: RNDr. Monika Tvrdoňová, PhD.								

Date of last modification: 04.08.2022
University: P. J.	Šafárik	University	in Košice
-------------------	---------	------------	-----------

Faculty: Faculty of Science

Course ID: ÚCHV/	Course name: Organická chémia II
OCH1b/21	

Course type, scope and the method: Course type: Lecture / Practice

Recommended course-load (hours): Per week: 2 / 2 Per study period: 28 / 28

Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 3.

Course level: I.

Prerequisities:

Conditions for course completion:

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.

Learning outcomes:

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.

Brief outline of the course:

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). β -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, stereoids 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, Willey&Sons Inc., 2017.

3. J. E. McMurry: Organic Chemistry, Vysoké učení technické v Brne, 2007, VUTIUM, ISBN: 978-80-214-3291-8 (VUT v Brne).

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: 22

А	В	С	D	Е	FX
9.09	18.18	18.18	22.73	27.27	4.55

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

Date of last modification: 04.08.2022

University: P. J.	Šafárik	University	v in Košice
-------------------	---------	------------	-------------

Faculty: Faculty of Science

Course ID: ÚCHV/ **Course name:** Physical Chemistry I FCH1a/03

Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours):

Per week: 3 / 2 Per study period: 42 / 28

Course method: present

Number of ECTS credits: 7

Recommended semester/trimester of the course: 3.

Course level: I.

Prerequisities: ÚMV/MTCb/13

Conditions for course completion:

Two partial tests from computational seminars in 6th and 12th week of semester. Examination.

Learning outcomes:

Basic course on thermodynamics, chemical and phase equilibria.

Brief outline of the course:

State of aggregation, laws for ideal and real gases, liquids and solids - characteristics and properties. Principles of thermodynamics, thermodynamic equilibrium, characteristic thermodynamic changes, heat, work, internal energy, enthalpy, entropy, 1st, 2nd and 3rd law of thermodynamics, Gibbs energy. Thermochemistry, heat of reaction, 1st and 2nd thermometric laws, enthalpy of formation, enthalpy of combustion, calorimetry. Phase equilibria, Gibbs' phase rule, phase diagrams for 1-, 2- and 3-componental systems, colligative properties, activity. Adsorption, adsorption isotherms. Diffusion. Chemical equilibrium, van't Hoff's reaction isotherm, isobar and isochore, influence of temperature and pressure on chemical equilibrium. Electrochemistry. Conductivity of electrolytes, utilization, Faraday's law, strong electrolytes - theory, activity coefficients, ionic strength. Weak electrolytes, theories of acids and bases, buffer solutions, hydrolysis of salts.

Recommended literature:

T. Engel, P. Reid : Physical Chemistry, Pearson Educat. Inc., San Francisco 2006 P.W. Atkins : Physical Chemistry,Oxford University Presss, Oxford 1986, 1990, 1994, 1998 W.J. Moore : Physical Chemistry,Longman, London 1972 and newer editions

Course language:

Notes:

Course assessment

Total number of assessed students: 632

А	В	С	D	Е	FX
15.82	18.51	20.57	18.04	17.88	9.18

Provides: prof. RNDr. Renáta Oriňaková, DrSc., RNDr. Jana Shepa, PhD., RNDr. Radka Gorejová, PhD., RNDr. Alexandra Gubóová, RNDr. Ivana Šišoláková, PhD., univerzitná docentka, RNDr. Martina Petráková, RNDr. Veronika Niščáková, Mgr. Viktória Čákyová

Date of last modification: 12.11.2021

University: P. J. Ša	čárik Univers	itv in Košice
----------------------	---------------	---------------

Faculty: Faculty of Science

Course ID: ÚCHV/	Course name: Physical Chemistry II
FCH1b/10	

Course type, scope and the method: Course type: Lecture / Practice

Recommended course-load (hours): Per week: 3 / 2 Per study period: 42 / 28

Course method: present

Number of ECTS credits: 6

Recommended semester/trimester of the course: 4.

Course level: I.

Prerequisities: ÚCHV/FCH1a/03 or ÚCHV/FCH1a/21 or ÚCHV/FCHU/10

Conditions for course completion:

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%.

Learning outcomes:

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.

Brief outline of the course:

Electrochemistry. Equilibrium homogeneous processesn 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. Pocesses 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 low determination. Theory of chemical kinetics.

Ttemperature dependence of reaction rates. Collision theory. Activated complex theory. Chain reactions. Structure and rate lows of chain reactions. Explosion. Polymerisation reactions. Photochemical reactions. Catalysis. Theory of homogeneous catalysis. Chemical oscillation reactions. Heterogeneous processes. Difusion. Physical and chemical adsorption. Adsorption and diffusion. Processes in heterogeneous electrochemical systems. Electrode kinetics, activation and diffusive mechanism of charge transfer.

Application of theoretical relationships on the solving of concrete problems and on the calculation of examples during seminars.

Recommended literature:

T. Engel, P. Reid : Physical Chemistry, Pearson Educat. Inc., San Francisco 2006 P.W. Atkins : Physical Chemistry,Oxford University Presss, Oxford 1986, 1990, 1994, 1998 W.J. Moore : Physical Chemistry,Longman, London 1972 and newer editions

Course language:

Slovak language

Notes:

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.

Course assessment

Total number of assessed students: 606

А	В	С	D	Е	FX
15.68	18.32	22.11	18.98	21.12	3.8

Provides: prof. RNDr. Renáta Oriňaková, DrSc., RNDr. Jana Shepa, PhD., RNDr. Ján Macko, PhD., RNDr. Ivana Šišoláková, PhD., univerzitná docentka

Date of last modification: 25.11.2021

Faculty: Faculty of Science

Course ID: ÚCHV/	Course name: Physical chemistry I
FCH1a/21	

Course type, scope and the method:

Course type: Lecture / Practice

Recommended course-load (hours): Per week: 2 / 2 **Per study period:** 28 / 28

Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 3.

Course level: I.

Prerequisities: ÚMV/MTCb/13

Conditions for course completion:

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%.

Learning outcomes:

Students will gain knowledge on basic thermodynamic laws, the principles of chemical and phase equilibria as well as equilibria in electrolyte solutions.

Brief outline of the course:

State of aggregation, laws for ideal and real gases, liquids and solids - characteristics and properties. Principles of thermodynamics, thermodynamic equilibrium, characteristic thermodynamic changes, heat, work, internal energy, enthalpy, entropy, 1st, 2nd and 3rd law of thermodynamics, Gibbs energy. Thermochemistry, heat of reaction, 1st and 2nd thermometric laws, enthalpy of formation, enthalpy of combustion, calorimetry. Phase equilibria, Gibbs' phase rule, phase diagrams for 1-, 2- and 3-componental systems, colligative properties, activity. Adsorption, adsorption isotherms. Diffusion. Chemical equilibrium, van't Hoff's reaction isotherm, isobar and isochore, influence of temperature and pressure on chemical equilibrium. Electrochemistry. Conductivity of electrolytes, utilization, Faraday's law, strong electrolytes - theory, activity coefficients, ionic strength. Weak electrolytes, theories of acids and bases, buffer solutions, hydrolysis of salts.

Recommended literature:

T. Engel, P. Reid : Physical Chemistry, Pearson Educat. Inc., San Francisco 2006 P.W. Atkins : Physical Chemistry,Oxford University Presss, Oxford 1986, 1990, 1994, 1998 W.J. Moore : Physical Chemistry,Longman, London 1972 and newer editions

Course language:

Slovak language.

Notes:

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.

Course assessment

Total number of assessed students: 19

А	В	С	D	Е	FX
5.26	31.58	31.58	15.79	10.53	5.26

Provides: prof. RNDr. Renáta Oriňaková, DrSc., RNDr. Ján Macko, PhD., RNDr. Ivana Šišoláková, PhD., univerzitná docentka

Date of last modification: 25.11.2021

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ Course name: Physics I CHF1a/03			
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 3 / 2 Per study period: 42 / 28 Course method: present			
Number of ECTS credits: 6			
Recommended semester/trimester of the course: 1.			
Course level: I.			
Prerequisities:			
Conditions for course completion: Test Examination			
Learning outcomes: To learn basic knowledges of mechanics, thermodynamics and electrostatics. To learn to apply the well- handled curriculum for numeric solving of relevant physical problems and exercises.			
Brief outline of the course: Kinematics and mechanics of a particle. Motion in the gravitational field. Newton's laws of motion. Newton's law of gravitations. Work and mechanical energy. Mechanics of a system of particles. 1st and 2nd impulse theorems. Rotational movement of particles. Moment of inertia. Deformation of solids. Hooke's law. Hydrostatics and hydrodynamics of fluids. Kinetic theory of gases. Thermodynamic laws. Entropy. Heat transfer.			
 Recommended literature: 1. H.E.Gettys, F.J.Keller, M.J.Skove: Physics – classical and modern, Mc Graw – Hill Book Co., New York, 1989. 2. F.J.Keller, H.E.Gettys, M.J.Skove: Physics, Mc Graw – Hill, Inc., New York, 1993. 			
Course language:			
Notes:			
Course assessment Total number of assessed students: 840			
A B C D E FX			
15.71 19.05 20.12 19.52 15.71 9.88			
Provides: doc. RNDr. Adriana Zeleňáková, PhD., RNDr. Róbert Tarasenko, PhD., RNDr. Andrea Lachová, PhD.			
Date of last modification: 03.05.2015			
Approved: doc. RNDr. Ivan Potočňák, PhD.			

University: P. J. Šafár	ik University in Košice						
Faculty: Faculty of So	Faculty: Faculty of Science						
Course ID: ÚFV/ CHF1a/22	Course name: Physics I						
Course type, scope an Course type: Lectur Recommended cour Per week: 3 / 1 Per s Course method: pre	nd the method: e / Practice rse-load (hours): study period: 42 / 14 sent						
Number of ECTS cre	edits: 5						
Recommended semes	ster/trimester of the course: 1.						
Course level: I.							
Prerequisities:							
Conditions for course To successfully com mechanics, molecular The credit evaluation 1 credits: direct teachi fulfillment of homewo 2 credits: successful m papers in the 6th and 2 credits: obtaining th the semester and the e Learning outcomes:	e completion: plete the course, the student must demonstrate sufficient knowledge of physics and thermodynamics. of the course takes into account the following student workload: ing in lectures and numerical exercises, self-study of recommended literature, ork assignments mastery of numerical exercises and obtaining an A-E rating from two numerical 13th week of the semester ne A-E evaluation from two theoretical papers in the 6th and 13th weeks of evaluation for the oral exam.						
 After completing the line in the student will demore by the brief content of the result of education a) Complementing thermodynamics. b) They will learn to a problems and problem c) Creates the necessary 	actures and numerical exercises and after successfully passing the final exam, instrate adequate mastery of the content standard of the course, which is defined of the course and the recommended literature. on is: and summarizing knowledge of mechanics, molecular physics and pply the mastered subject matter to the numerical solution of relevant physical ns. ary terminological and knowledge base for mastering related subjects.						
Brief outline of the co	ourse:						
Recommended litera 1. Halliday D., Resnic 2. Krempasky J.: Fyzi 3. Hajko V., Daniel - S 4. Horák Z., Krupka H 5. Hajko V. a kol: Fyzi	ture: ck R., Walker J.: Fyzika, VUTIUM Brno, 2000. ika, Veda Bratislava, 1982. Szabó J.: Základy fyziky, Veda, Bratislava 1983. F.: Fyzika, SNTL a Alfa, Praha 1981. zika v príkladoch, Alfa, Bratislava 1983.						
Course language: english							

Notes:

Lectures can be done at presence form or online form using MS Teams and BBB. Education form is

updated at the begining of the subject. All ppt presentations are accesible in LMS UPJŠ.

Course assessment							
Total number o	f assessed studen	ts: 49					
A B C D E FX							
18.37 32.65 16.33 24.49 8.16 0.0							
Provides: doc. RNDr. Adriana Zeleňáková, PhD.							
Date of last modification: 30.09.2021							
Approved: doc	. RNDr. Ivan Pot	očňák, PhD.					

University: P. J. Šafa	árik University in Košice					
Faculty: Faculty of S	Science					
Course ID: ÚFV/ CHF1b/12	Course name: Physics II					
Course type, scope a Course type: Lectu Recommended cou Per week: 3 / 1 Per Course method: pr	Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 3 / 1 Per study period: 42 / 14 Course method: present					
Number of ECTS cr	redits: 5					
Recommended sem	ester/trimester of the course: 2.					
Course level: I.						
Prerequisities: ÚFV	/CHF1a/03 or ÚFV/CHF1a/22 and ÚFV/UVF/12					

Conditions for course completion:

Continuous active acquisition of the subject is required already during the Physics II course itself, which is necessary for the independent management of individual exercises and in solving specific homework assignments. Another condition for completing the course is active participation in lectures and seminars. In the exercises, the student will get a concrete idea of how to apply theoretical knowledge to solve various situations, from abstract model situations to practical engineering calculations. The student regularly independently develops home projects and presents the results at a joint meeting. Another condition for obtaining credits is successful completion of two written tests from the theoretical part and two written tests from the solution of the given exercises. In the theoretical part, the student demonstrates an understanding of basic concepts and relationships between them, finding connections and understanding of the course as a coherent whole logically built on the basis of the gradual incorporation of individual interactions. The minimum threshold for completing the course is successful completion of individual assignments during the semester and elaboration of all the above tests to more than 50 percent.

Learning outcomes:

After completing the course Physics II, students will gain basic knowledge of classical electricity and magnetism, electrical and magnetic properties of gases, liquids and solids, alternating electric and magnetic fields, properties of electromagnetic waves in terms of geometric and wave optics and quantum-mechanical properties of atoms. This knowledge will allow them to better understand both the essence and the interrelationship between the objects, which will be dealt with later in specialized courses.

Brief outline of the course:

 Electrostatics. Forces in an electric field - Coulomb's law. Electric field strength. Gauss's theorem. Electrostatic field work; potential, voltage. Conductor capacity, capacitors. Electric field energy.
 Electric dipole. Electrostatic phenomena in dielectrics - polarization, electrical induction in metals. Piezoelectric phenomenon and its use. Electrodynamics. Steady electric current. Ohm's law, conductor resistance. Kirchhoff's laws. Electromotive and terminal voltage. Work and power of electric current.

3. Magnetism. Magnetic field. Magnetic field induction, Biott - Savart law.

Total current law, Stokes' theorem. Movement of electric charge in electric and magnetic field. Ampere's and Lorentz's force. Electromagnetic induction - Faraday's law.

4. Self-induction, mutual induction. Magnetic field energy. Magnetic field in the material environment. Elementary magnetic field of an atom. Magnetic properties of substances: dia-, para-, ferro- and antiferromagnets. Magnetization curve, hysteresis loop, magnetic domains. Magnetic materials in practice.

5. Origin and properties of alternating current, effective values, power. Transformers.

Electric oscillations - electric oscillating circuit, undamped oscillations. RLC circuits - attenuated oscillations, forced, series and parallel resonance.

6. Electrical properties of solids. Band theory of solids. Metals. Semiconductors and their use. Electron emission from metal. Thermoemission and its use. Electron tubes.

7. Contact EMN. Thermoelectric phenomena and their use. Conduction of electric current in liquids and gases. Electrolytic dissociation. Faraday's laws on electrolysis. Separate and non-independent discharge in gases-use.

8. Mechanical oscillations - linear harmonic oscillator. Undamped, damped, forced oscillations, resonance. Compound oscillation. Mechanical waves, their origin and properties. Wave equations. Huygens principle. Interference, wave bending.

9. Electromagnetic field. Maxwell's equations. Electromagnetic waves, plane wave. Electromagnetic energy flow. radiation. Poynting vector. The law of conservation of energy in an electromagnetic field.

10. Light. Polarization state. Basic laws of geometric optics. Reflection and refraction of light. Refractive index.

Interference and diffraction of light. Phenomena on thin film, edges, crevices and grids.

11. Birefringence. Polarization of light, use. Photons. External and internal photoelectric effect.

12. Quantum mechanics. Pauli's exclusion principle. Wave-corpuscular dualism. Wave function. Quantum states. Momentum of microparticles. Electron spin.

Recommended literature:

1. F.J.Keller, H.E.Gettys, M.J.Skove: Physics, Mc Graw – Hill, Inc., New York, 1993.

Course language:

english

Notes:

Subject Fyzika II is realized in attendance form. If necessary (e.g. Covid pandemic) it is taught online using software MS Teams, which allows to maintain contact with students even in adverse conditions and also allows to meet the requirements of the subject.

Course assessment

Total number of assessed students: 753

А	В	С	D	Е	FX
10.76	16.33	23.9	22.18	16.33	10.49

Provides: doc. RNDr. Alžbeta Orendáčová, DrSc., Mgr. Tomáš Samuely, PhD., univerzitný docent, RNDr. Róbert Tarasenko, PhD.

Date of last modification: 22.09.2021

University: P. J.	Šafárik Univers	sity in Košice						
Faculty: Faculty	Faculty: Faculty of Science							
Course ID: ÚFV ZP2/99	V/ Course name: Physics practical							
Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: 3 Per study period: 42 Course method: present								
Number of ECT	S credits: 3							
Recommended	semester/trime	ster of the cours	e: 2.					
Course level: I.					_			
Prerequisities:								
Conditions for a	course complet	ion:						
Learning outcom The goal is to knowledge com Prekladač Goog hľadanie nových The goal is to go	Learning outcomes: The goal is to get acquainted with the real physical experiments, a complement theoretical knowledge connected in the subject of General Physics by the practical way. Prekladač Google pre firmy:Nástroje pre prekladateľovPrekladač webových stránokNástroj na hľadanie nových trhov The goal is to get acquainted with the real physical experiments, a comp							
Brief outline of The goal of this kinds and calcul Students selected physics, electric	the course: laboratory exer- us of mistakes, d for practical ta ity and magnetis	cises is to familia with measured re sks completed an sm, and optics.	lize the students sults processing d verified knowl	s with measurem , and with preser edge of mechani	ent metods, with ntation of results. cs and molecular			
Recommended literature: Degro, J., Ješková, Z., Onderová Ľ., Kireš, M.: Basic physical measurements I, Ed. PF UPJŠ Košice 2007 (in slovak) Brož, J. and all.: Fundamental physical measurements (I), SPN, 1967 (in czech)								
Course languag	e:							
Notes:								
Course assessment Total number of assessed students: 530								
А	В	С	D	Е	FX			
41.32 34.91 19.62 2.64 0.94 0.57								
Provides: doc. R	NDr. Ján Füzer	, PhD., RNDr. Ro	öbert Tarasenko,	PhD.				
Date of last modification: 18.11.2021								
Approved: doc.	Approved: doc. RNDr. Ivan Potočňák, PhD.							

University: P. J.	Šafárik Univers	ity in Košice							
Faculty: Faculty of Science									
Course ID: ÚCH PACH/03	Course ID: ÚCHV/ Course name: Practical from Inorganic Chemistry PACH/03								
Course type, sco Course type: Pr Recommended Per week: 6 Per Course method	Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: 6 Per study period: 84 Course method: present								
Number of ECT	S credits: 6								
Recommended s	semester/trimes	ster of the cours	e: 2.						
Course level: I.									
Prerequisities: Ú	JCHV/CHV1/99)							
Conditions for c test Results from rep	ourse completi orts, tests. Achi	on: eved practical ab	ilities.						
Learning outcom The practical acc chemical propert	nes: quirements at p ties by common	reparation and st laboratory techn	udy of inorgan iques.	ic compounds and	their physico-				
Brief outline of t The utilization inert and non oxides(CO2, A KMnO4), binar and coordination K3[Al(C2O4)3].	the course: of common -aqueous cond 12O3·xH2O), t y salts(NH4)Fe compounds ([C 3H2O).	laboratory tec ditions at prep nitrides(Mg3N2), e(SO4)2·12H2O) Cr2(CH3COO)4(hniques and paration of e acids (HNO , halides (CuC H2O)2], [CoCl2	also the work lements (H2, 0 3, H3BO3), sal 21, CuCl2·2H2O, 2(en)2]Cl, [Cu(NH	in anaerobic, D2, Cu, Ni), ts((NH4)2SO4, SnI4, CuBr2) I3)4]SO4·H2O,				
Recommended l	iterature:								
Course language	e:								
Notes:									
Course assessment Total number of assessed students: 531									
А	В	С	D	Е	FX				
58.0 33.9 5.27 1.88 0.94 0.0									
Provides: prof. R Miroslav Almáši,	RNDr. Zuzana V , PhD., Mgr. Mi	argová, Ph.D., do chaela Rendošov	oc. RNDr. Juraj á, PhD.	Kuchár, PhD., doo	c. RNDr.				
Date of last mod	ification: 28.10	0.2021							
Approved: doc.]	RNDr. Ivan Pote	očňák, PhD.							

University	P 1	I Šafárik	University	in Košice
University.	Г. J	J. Salalik	University	III KUSICE

Faculty: Faculty of Science

Course ID: ÚCHV/	Course name: Practical in Analytical Chemistry
PANCH/06	

Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: 6 Per study period: 84

Course method: present

Number of ECTS credits: 6

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities:

Conditions for course completion:

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.

 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.
 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 - 2×15 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).

Learning outcomes:

Application of theoretical knowledge of quantitative analysis into analytical laboratory practise.

Brief outline of the course:

Practical in quantitative analysis. Quantitative methods. Gravimetry, general principles of method. Volumetric methods. Preparation of accurate solutions. Indication of equvivalency point. Titration curves, calculations in volumetric analysis, measurement errors. Acidimetry, alkalimetry. Manganometry. Iodometry. Complexometry. Argentometry. Selected instrumental analytical methods - electrochemical, optical, separation. Evaluation of the results in instrumental analysis.

Recommended literature:

- 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.Mel'uch: 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.

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.

Course assessment

Total number of assessed students: 469

А	В	С	D	Е	FX
54.8	24.73	15.78	2.56	2.13	0.0

Provides: RNDr. Rastislav Serbin, PhD., RNDr. Jana Šandrejová, PhD., univerzitná docentka

Date of last modification: 15.11.2021

University: P. J. Ša	ărik Universit	y in Košice
----------------------	----------------	-------------

Faculty: Faculty of Science

Course ID: ÚCHV/	Course name: Practical in Physical Chemistry
PFCH/03	

Course type, scope and the method: Course type: Practice Recommended course-load (hours):

Per week: 6 Per study period: 84

Course method: present

Number of ECTS credits: 6

Recommended semester/trimester of the course: 4.

Course level: I.

Prerequisities: ÚCHV/FCH1a/03 or ÚCHV/FCH1a/21

Conditions for course completion:

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. Elaboration of a paper on a selected topic and its presentation.
- 5. Assessment of theoretical knowledges and practical skills.

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.

Learning outcomes:

Theoretical principles, description of each technique and appropriate physical chemistry experiments.

Brief outline of the course:

Experimental verification of theoretical knowledge on thermodynamics, thermochemistry, chemical equilibria (determination of enthalpy, phase diagrams), colligative properties (cryoscopy, ebulioscopy), 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).

Recommended literature:

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

Course language:

Notes:

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

5	5							
Course assessment Total number of assessed students: 448								
А	A B C D E FX							
68.53	68.53 22.54 6.47 0.89 1.56 0.0							
Provides: RNDr. František Kaľavský, RNDr. Andrea Morovská Turoňová, PhD., RNDr. Ján Macko, PhD., RNDr. Jana Shepa, PhD.								
Date of last modification: 22.07.2022								
Approved: doc.	. RNDr. Ivan Pot	očňák, PhD.						

University: P. J. Šafá	rik Univers	ity in Košice				
Faculty: Faculty of S	Science					
Course ID: ÚCHV/ PRCH2u/10	IV/ Course name: Proseminár z chémie II					
Course type, scope a Course type: Lectu Recommended cou Per week: 0 / 1 Per Course method: pr	and the met re / Practice rse-load (h study peri- esent	thod: ours): od: 0 / 14				
Number of ECTS ci	redits: 1					
Recommended seme	ester/trimes	ster of the course	e: 2.			
Course level: I.						
Prerequisities: ÚCH	V/VCHU/1	0				
Conditions for cour	se completi	on:				
Learning outcomes:						
Brief outline of the	course:					
Recommended liter	ature:					
Course language:						
Notes:						
Course assessment Total number of asse	essed studen	ts: 1				
A	В	С	D	Е	FX	
100.0	100.0 0.0 0.0 0.0 0.0 0.0					
Provides: RNDr. Ma	rtin Vavra, I	PhD., doc. RNDr.	Juraj Kuchár, P	hD.	I	
Date of last modific	ation:					
Approved: doc. RNI	Dr. Ivan Pot	očňák, PhD.				
Total number of asse A 100.0 Provides: RNDr. Ma Date of last modific: Approved: doc. RNI	B 0.0 rtin Vavra, I ation: Dr. Ivan Pot	ts: 1 C 0.0 PhD., doc. RNDr. očňák, PhD.	D 0.0 Juraj Kuchár, P	E 0.0 hD.	FX 0.0	

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: ÚTVŠ/ ÚTVŠ/CM/13Course name: Seaside Aerobic Exercise					
Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present					
Number of ECTS credits: 2					
Recommended semester/trimester of the course:					
Course level: I., II.					
Prerequisities:					
Conditions for course completion: 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- aerobics, water exercise, yoga, Pilates and others					
Learning outcomes: 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: - perform basic aerobics steps and basics of health exercises, - conduct verbal and non-verbal communication with clients during exercise, - organise and manage the process of physical recreation in leisure time					
 Brief outline of the course: Brief outline of the course: Basic aerobics – low impact aerobics, high impact aerobics, basic steps and cuing Basics of aqua fitness Basics of Pilates Health exercises Bodyweight exercises Swimming Relaxing yoga exercises Power yoga Yoga relaxation Final assessment Students can engage in different sport activities offered by the sea resort – swimming, rafting, volleyball, football, table tennis, tennis and other water sports in particular. 					
Recommended literature: 1. BUZKOVÁ, K. 2006. Fitness jóga. Praha: Grada. 167 s.					

 ČECHOVSKÁ, I., MILEROVÁ, H., NOVOTNÁ, V. Aqua-fitness. Praha: Grada. 136 s. EVANS, M., HUDSON, J., TUCKER, P. 2001. Umění harmonie: meditace, jóga, tai-či, strečink. 192 s. JARKOVSKÁ, H., JARKOVSKÁ, M. 2005. Posilováni s vlastním tělem 417 krát jinak. Praha: Grada. 209 s. KOVAŘÍKOVÁ, K. 2017. Aerobik a fitness. Karolium, 130 s. 				
Course language: Slovak language				
Notes:				
Course assessment Total number of assessed students: 54				
abs	n			
11.11 88.89				
Provides: Mgr. Agata Dorota Horbacz, PhD.				
Date of last modification: 29.03.2022				
Approved: doc. RNDr. Ivan Potočňák, PhD.				

University: P. J. Ša	ărik Universit	y in Košice
----------------------	----------------	-------------

Faculty: Faculty of Science

Course ID: ÚCHV/	Course name: Separation Methods
ASM/03	

Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours):

Per week: 2 / 1 Per study period: 28 / 14

Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 6.

Course level: I.

Prerequisities: (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)

Conditions for course completion:

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.

Learning outcomes:

Survey of basic principles, theoretical background and applications of separation methods in research and analytical practice.

Brief outline of the course:

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.

Recommended literature:

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

Course language:

Slovak, english language

Notes:

Course assessm Total number o	nent f assessed studen	ts: 500					
А	A B C D E FX						
28.4	26.0	25.2	12.8	5.4	2.2		
Provides: doc.]	Provides: doc. RNDr. Taťána Gondová, CSc.						
Date of last modification: 01.08.2022							
Approved: doc. RNDr. Ivan Potočňák, PhD.							

University: P. J. Šafárik University in Košice							
Faculty: Faculty of Science							
Course ID: ÚC ASC1/99	HV/ Course na	me: Separation 1	Methods Practica	als			
Course type, sc Course type: I Recommended Per week: 5 Pe Course metho	Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: 5 Per study period: 70 Course method: present						
Number of EC	FS credits: 5						
Recommended	semester/trimes	ter of the course	e: 6.				
Course level: I.							
Prerequisities:	ÚCHV/ASM/03						
Conditions for 1.Take part in a 2. Assessment submitted proto	course completing Il exercises. is based on acting cols from individ	on: ve participation lual tasks.	in all exercises	according to the	e schedule and		
Learning outco To obtain practi	mes: cal experiences f	or applications o	f separation met	hods in analytical	l practice.		
Brief outline of the course: Application of gas chromatography, high-performance liquid chromatography and thin-layer chromatography methods in analysis. Application of electrophoretic methods. Spectrophotometric determination of selected analytes after extraction treatment of sample. Application of ion-exchange chromatography in analytical practice							
Recommended literature: 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. T.Gondová a kol.: Separation methods practicals - actual texts for exercises							
Course language:							
Notes:							
Course assessment Total number of assessed students: 146							
А	В	С	D	Е	FX		
89.04	39.04 10.27 0.68 0.0 0.0 0.0						
Provides: doc. RNDr. Taťána Gondová, CSc.							
Date of last modification: 15.11.2021							
Approved: doc.	Approved: doc. RNDr. Ivan Potočňák, PhD.						

University: P. J. Šafárik	University in Košice
Faculty: Faculty of Scien	nce
Course ID: ÚTVŠ/ Co TVa/11	ourse name: Sports Activities I.
Course type, scope and Course type: Practice Recommended course- Per week: 2 Per study Course method: preser	the method: -load (hours): period: 28 nt
Number of ECTS credi	ts: 2
Recommended semester	r/trimester of the course: 1.
Course level: I., II.	
Prerequisities:	
Conditions for course c Min. 80% of active parti	ompletion: cipation in classes.
Learning outcomes: Sports activities in all the They have a great impace enables students to stree improve.	Fir forms prepare university students for their professional and personal life. et on physical fitness and performance. Specialization in sports activities ngthen their relationship towards the selected sport in which they also
Brief outline of the cours Brief outline of the cours The Institute of physical activities aerobics; aikid yoga, power yoga, pilat tennis, chess, volleyball, Additionally, the Institu offers winter courses (sl the Tisza River) with an participation.	rse: se: education and sport at the Pavol Jozef Šafárik University offers 20 sports o, basketball, badminton, body-balance, body form, bouldering, floorball, es, swimming, fitness, indoor football, SM system, step aerobics, table tabata, cycling. te of physical education and sport at the Pavol Jozef Šafárik University ki course, survival) and summer courses (aerobics by the sea, rafting on attractive programme, sports competitions with national and international
Recommended literatur BENCE, M. et al. 2005. [online] Dostupné na: ht BUZKOVÁ, K. 2006. F 8024715252. JARKOVSKÁ, H, JARH Grada. ISBN 978802475 KAČÁNI, L. 2002. Futb 8089197027. KRESTA, J. 2009. Futsa LAWRENCE, G. 2019. SNER, Wolfgang. 2004.	 Plávanie. Banská Bystrica: FHV UMB. 198s. ISBN 80-8083-140-8. tps://www.ff.umb.sk/app/cmsFile.php?disposition=a&ID=571 itness jóga, harmonické cvičení těla I duše. Praha: Grada. ISBN KOVSKÁ, M. 2005. Posilování s vlastním tělem 417 krát jinak. Praha: 67308. al:Tréning hrou. Bratislava: Peter Mačura – PEEM. 278s. ISBN I.Praha: Grada Publishing, a.s. 112s. ISBN 9788024725345. Power jóga nejen pro sportovce. Brno: CPress. ISBN 9788026427902. 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: 15193

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
86.05	0.07	0.0	0.0	0.0	0.05	8.69	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., doc. PaedDr. Ivan Uher, MPH, PhD., prof. RNDr. Stanislav Vokál, DrSc., Mgr. Zuzana Küchelová, PhD.

Date of last modification: 07.02.2024

University: P. J. Šafá	rik University in Košice
Faculty: Faculty of S	cience
Course ID: ÚTVŠ/ TVb/11	Course name: Sports Activities II.
Course type, scope a Course type: Practic Recommended cour Per week: 2 Per stu Course method: pre	nd the method: ce cse-load (hours): dy period: 28 esent
Number of ECTS cr	edits: 2
Recommended seme	ster/trimester of the course: 2.
Course level: I., II.	
Prerequisities:	
Conditions for cours active participation ir	e completion: n classes - min. 80%.
Learning outcomes: Sports activities in all They have a great im enables students to s improve.	their forms prepare university students for their professional and personal life. apact on physical fitness and performance. Specialization in sports activities strengthen their relationship towards the selected sport in which they also
Brief outline of the c Brief outline of the co The Institute of physi activities aerobics; ai yoga, power yoga, p tennis, chess, volleyb Additionally, the Inst offers winter courses the Tisza River) with participation.	ourse: ourse: cal education and sport at the Pavol Jozef Šafárik University offers 20 sports kido, basketball, badminton, body-balance, body form, bouldering, floorball, ilates, swimming, fitness, indoor football, SM system, step aerobics, table all, tabata, cycling. titute of physical education and sport at the Pavol Jozef Šafárik University (ski course, survival) and summer courses (aerobics by the sea, rafting on an attractive programme, sports competitions with national and international
Recommended litera BENCE, M. et al. 200 [online] Dostupné na BUZKOVÁ, K. 2006 8024715252. JARKOVSKÁ, H, JA Grada. ISBN 978802 KAČÁNI, L. 2002. F 8089197027. KRESTA, J. 2009. Fu LAWRENCE, G. 201 SNER, Wolfgang. 20	 ture:)5. Plávanie. Banská Bystrica: FHV UMB. 198s. ISBN 80-8083-140-8. : https://www.ff.umb.sk/app/cmsFile.php?disposition=a&ID=571 9. Fitness jóga, harmonické cvičení těla I duše. Praha: Grada. ISBN ARKOVSKÁ, M. 2005. Posilování s vlastním tělem 417 krát jinak. Praha: 4757308. utbal:Tréning hrou. Bratislava: Peter Mačura – PEEM. 278s. ISBN ntsal.Praha: Grada Publishing, a.s. 112s. ISBN 9788024725345. 9. Power jóga nejen pro sportovce. Brno: CPress. ISBN 9788026427902. 04. 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: 13318

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
84.37	0.51	0.02	0.0	0.0	0.05	10.78	4.28

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., doc. PaedDr. Ivan Uher, MPH, PhD., prof. RNDr. Stanislav Vokál, DrSc., Mgr. Zuzana Küchelová, PhD.

Date of last modification: 07.02.2024

University: P. J. Šafár	rik University in Košice
Faculty: Faculty of S	cience
Course ID: ÚTVŠ/ TVc/11	Course name: Sports Activities III.
Course type, scope a Course type: Practic Recommended cour Per week: 2 Per stu Course method: pre	nd the method: ce rse-load (hours): dy period: 28 esent
Number of ECTS cro	edits: 2
Recommended seme	ster/trimester of the course: 3.
Course level: I., II.	
Prerequisities:	
Conditions for cours min. 80% of active pa	e completion: articipation in classes
Learning outcomes: Sports activities in all They have a great im enables students to s improve.	their forms prepare university students for their professional and personal life. apact on physical fitness and performance. Specialization in sports activities strengthen their relationship towards the selected sport in which they also
Brief outline of the c Brief outline of the co The Institute of physi activities aerobics; ai yoga, power yoga, p tennis, chess, volleyb Additionally, the Inst offers winter courses the Tisza River) with participation.	ourse: ourse: cal education and sport at the Pavol Jozef Šafárik University offers 20 sports kido, basketball, badminton, body-balance, body form, bouldering, floorball, ilates, swimming, fitness, indoor football, SM system, step aerobics, table all, tabata, cycling. titute of physical education and sport at the Pavol Jozef Šafárik University (ski course, survival) and summer courses (aerobics by the sea, rafting on an attractive programme, sports competitions with national and international
Recommended litera BENCE, M. et al. 200 [online] Dostupné na BUZKOVÁ, K. 2006 8024715252. JARKOVSKÁ, H, JA Grada. ISBN 978802 KAČÁNI, L. 2002. F 8089197027. KRESTA, J. 2009. Fu LAWRENCE, G. 201 SNER, Wolfgang. 20	 Ature: D5. Plávanie. Banská Bystrica: FHV UMB. 198s. ISBN 80-8083-140-8. https://www.ff.umb.sk/app/cmsFile.php?disposition=a&ID=571 Fitness jóga, harmonické cvičení těla I duše. Praha: Grada. ISBN ARKOVSKÁ, M. 2005. Posilování s vlastním tělem 417 krát jinak. Praha: 4757308. utbal:Tréning hrou. Bratislava: Peter Mačura – PEEM. 278s. ISBN utsal.Praha: Grada Publishing, a.s. 112s. ISBN 9788024725345. Power jóga nejen pro sportovce. Brno: CPress. ISBN 9788026427902. 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: 9100

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
88.37	0.07	0.01	0.0	0.0	0.02	4.46	7.07

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., doc. PaedDr. Ivan Uher, MPH, PhD., prof. RNDr. Stanislav Vokál, DrSc., Mgr. Zuzana Küchelová, PhD.

Date of last modification: 07.02.2024

University: P. J. Šafán	rik University in Košice
Faculty: Faculty of S	cience
Course ID: ÚTVŠ/ TVd/11	Course name: Sports Activities IV.
Course type, scope a Course type: Practic Recommended cour Per week: 2 Per stu Course method: pre	nd the method: ce rse-load (hours): dy period: 28 esent
Number of ECTS cro	edits: 2
Recommended semes	ster/trimester of the course: 4.
Course level: I., II.	
Prerequisities:	
Conditions for cours min. 80% of active pa	e completion: articipation in classes
Learning outcomes: Sports activities in all They have a great im enables students to s improve.	their forms prepare university students for their professional and personal life. pact on physical fitness and performance. Specialization in sports activities strengthen their relationship towards the selected sport in which they also
Brief outline of the c Brief outline of the co The Institute of physi activities aerobics; ail yoga, power yoga, p tennis, chess, volleyb Additionally, the Inst offers winter courses the Tisza River) with participation.	ourse: burse: cal education and sport at the Pavol Jozef Šafárik University offers 20 sports kido, basketball, badminton, body-balance, body form, bouldering, floorball, ilates, swimming, fitness, indoor football, SM system, step aerobics, table all, tabata, cycling. titute of physical education and sport at the Pavol Jozef Šafárik University (ski course, survival) and summer courses (aerobics by the sea, rafting on an attractive programme, sports competitions with national and international
Recommended litera BENCE, M. et al. 200 [online] Dostupné na: BUZKOVÁ, K. 2006 8024715252. JARKOVSKÁ, H, JA Grada. ISBN 9788024 KAČÁNI, L. 2002. F 8089197027. KRESTA, J. 2009. Fu LAWRENCE, G. 201 SNER, Wolfgang. 200	 ture: D5. Plávanie. Banská Bystrica: FHV UMB. 198s. ISBN 80-8083-140-8. thtps://www.ff.umb.sk/app/cmsFile.php?disposition=a&ID=571 Fitness jóga, harmonické cvičení těla I duše. Praha: Grada. ISBN ARKOVSKÁ, M. 2005. Posilování s vlastním tělem 417 krát jinak. Praha: 4757308. utbal:Tréning hrou. Bratislava: Peter Mačura – PEEM. 278s. ISBN utsal.Praha: Grada Publishing, a.s. 112s. ISBN 9788024725345. Power jóga nejen pro sportovce. Brno: CPress. ISBN 9788026427902. 04. 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: 5671

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
82.81	0.28	0.04	0.0	0.0	0.0	7.97	8.9

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., doc. PaedDr. Ivan Uher, MPH, PhD., prof. RNDr. Stanislav Vokál, DrSc., Mgr. Zuzana Küchelová, PhD.

Date of last modification: 07.02.2024

University: P. J. Šafá	rik University in Košice
Faculty: Faculty of S	cience
Course ID: ÚCHV/ ST/03	Course name: Stereochemistry
Course type, scope a Course type: Lectur Recommended cou Per week: 2 / 1 Per Course method: pre	nd the method: re / Practice rse-load (hours): study period: 28 / 14 esent
Number of ECTS cr	edits: 5
Recommended seme	ster/trimester of the course: 5.
Course level: I.	
Prerequisities:	
Conditions for course Midterm exam (succe End-of-semester Proj Final written exam (se Percentage rating: 10 and less FX. 20 p – Midterm exam 10 p – End-of-semese 70 p – Final written exam	Se completion: ess rate min. 51%). ect. success rate min. 51%). 00 - 91% (A), 90 - 81% (B), 80 - 71% (C), 70 - 61% (D), 60 - 51% (E), 50% h. ter Project. exam.
Learning outcomes: Understanding of the configuration. Relation and spectral properties	the stereochemistry of molecules. Determination of relative and absolute onship between stereochemistry and structure of molecules, energy, physical es.
Brief outline of the c Stereochemistry - bas of Stereoisomers. C relative Configuration mutarotation. Detern Stereoisomers. Topis Carbohydrates. Stere	ourse: ic principles. Isomerism, Configuration and Conformation Isomers. Properties onformation and reactivity of Alkanes and Cycloalkanes. Absolute and n. Chirality and Symmetry, Enantiomers, Diastereoisomers. Epimerization, nination of Enantiomer and Diastereoisomer Composition. Separation of m, prochirality. Stereochemistry of natural compounds, Stereochemistry of oselective synthesis-basic principles.
Recommended litera 1. Eliel L. E.,Wilen S 2. László Poppe L, N 2016.	ature: 6. E., Stereochemistry of Organic Compounds, Wiley, 1994. fógrádi M., Stereochemistry and Stereoselective Synthesis, Wiley-VCH,
Course language: slovak, english	
Notes: In-person course, alte	ernatively online course using the BigBlueButton 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: 198							
A B C D E FX							
68.18 12.63 10.61 2.53 6.06 0.0							
Provides: RNDr. Monika Tvrdoňová, PhD.							
Date of last modification: 04.08.2022							
Approved: doc. RNDr. Ivan Potočňák, PhD.							

University, F. J. Salarik University in Rusice	University:	P. J.	Šafárik	University	v in Košice
--	--------------------	-------	---------	------------	-------------

Faculty: Faculty of Science

Course ID: ÚCHV/ **Course name:** Structure determination - spectroscopic methods MUS/03

Course type, scope and the method:

Course type: Lecture / Practice

Recommended course-load (hours): Per week: 3 / 4 **Per study period:** 42 / 56

Course method: present

Number of ECTS credits: 10

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities:

Conditions for course completion:

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 written part of the test consists of 3 examples: 1. Solution of 2 given NMR spectra. 2. Calculation

number and symmetry of vibrations. 3. Solution of 2 structures of unknown compounds on the basis of combined

application of spectral methods. Oral part of the exam: Successful answering 5-7 questions.

Learning outcomes:

Learn students 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 (1H NMR, 13C NMR).

Brief outline of the course:

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. 1H NMR, 13C NMR, NMR of other nuclei. Two- and more dimensional NMR. NMR applications. Nuclear quadrupolar resonance - NQR, Electron parameganetic resonance - EPR.

Mossbauer spectroscopy. Relations between the spectra and structure, properties and reactions of chemical compound. Methods and instruments used for spectra measurements. Combined application of spectral methods for solution of chemical problems.

Recommended literature:

1. M. Hesse, H. Meier, B. Zeeh: Spectroscopic Methods in Organic Chemistry. Thieme, NY 1997.

2. L.G.Wade, Jr.: Organic Chemistry. Prentice Hall International, Inc. Englewood Cliffs, New Yersey 1995.
Course language:

slovak, english

Notes:

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.

Course assessm Total number o	1ent f assessed studen	ts: 621					
A B C D E FX							
19.65	28.5	29.47	18.68	3.7	0.0		
Provides: doc. RNDr. Ján Imrich, CSc., doc. RNDr. Juraj Kuchár, PhD., RNDr. Monika Tvrdoňová, PhD., RNDr. Zuzana Kudličková, PhD.							
Date of last modification: 04.08.2022							
Approved: doc. RNDr. Ivan Potočňák, PhD.							

Faculty: Faculty of Science

Course ID: ÚCHV/ **Course name:** Structure determination - spectroscopic methods MUS/21

Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours):

Per week: 3 / 4 **Per study period:** 42 / 56

Course method: present

Number of ECTS credits: 8

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities: ÚCHV/MLAC/21

Conditions for course completion:

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.

Learning outcomes:

Learn students 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 (1H NMR, 13C NMR).

Brief outline of the course:

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. 1H NMR, 13C 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.

Recommended literature:

1. Kováč Š., Ilavský D., Leško J.: Spektrálne metódy v organickej chémii a technológii, ALFA, Bratislava, 1987.

2. Milata V., Segl'a P.: Vybrané metódy molekulovej spektroskopie. STU BA, 2007.

3. Milata V., Segl'a 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.

Course language:

slovak	

slovak							
Notes: In-person cours The form of tea continuously.	e, alternatively o ching is specified	nline course usin d by the teacher a	g the BigBlueB at the beginning	utton tool or MS T of the semester, u	ſeams. pdated		
Course assessm Total number of	1ent f assessed studen	ts: 0					
А	A B C D E FX						
0.0	0.0	0.0	0.0	0.0	0.0		
Provides: doc. RNDr. Ján Imrich, CSc., doc. RNDr. Juraj Kuchár, PhD., RNDr. Monika Tvrdoňová, PhD., RNDr. Zuzana Kudličková, PhD.							
Date of last mo	dification: 07.11	.2022					
Approved: doc.	. RNDr. Ivan Pot	očňák, PhD.					

University: P I Šafá	rik University in Košice				
Enculture Enculture of C					
Faculty: Faculty of S	cience				
Course ID: UCHV/ SVKB/04	ourse ID: ÚCHV/ Course name: Students Scientific Conference VKB/04 VKB/04				
Course type, scope a Course type: Recommended cour Per week: Per stud Course method: pre	nd the method: rse-load (hours): ly period: esent				
Number of ECTS cr	edits: 4				
Recommended seme	ster/trimester of the cours	e: 6.			
Course level: I.					
Prerequisities:					
Conditions for cours Present the results of committee members	e completion: student's work at the Student and others present.	Scientific Conference and answer questions from			
Learning outcomes: The student will acqu and written processir student prepares to p of the professional pu	ire competences for indepening of obtained results and kn resent the obtained results in ablic at scientific conference	dent scientific work in the laboratory, for analysis nowledge. By presenting the obtained results, the n the defense of the bachelor's thesis and in front es.			
Brief outline of the c	ourse:				
Recommended litera	ature:				
Course language:					
Notes:					
Course assessment Total number of asse	ssed students: 12				
	abs n				
	100.0 0.0				
Provides:					
Date of last modifica	ition: 22.07.2022				
Approved: doc. RNE	Dr. Ivan Potočňák, PhD.				

University: P. J. Šafá	rik University in Košice					
Faculty: Faculty of S	Faculty: Faculty of Science					
Course ID: ÚFV/ DGS/21	Course name: Students` Digital Literacy					
Course type, scope a Course type: Practic Recommended cour Per week: 2 Per stu Course method: pre	nd the method: ce rse-load (hours): dy period: 28 esent					
Number of ECTS cr	edits: 2					
Recommended seme	ster/trimester of the course: 1.					
Course level: I.						
Prerequisities:						
Conditions for cours Summary evaluation 1. Practical ongoing a 3. Active participation absences allowed) at assignments)	e completion: based on ongoing assessment: issignments and their defense (at least 50% needed) on during face-to-face contact learning in classical or virtual classroom (3 nd during online learning (no absence, uploading all individual ongoing					
Learning outcomes: The student should of digital technologies (1. according to the cu 2. for better and mor learning and further c	btain and know to apply basic knowledge and skills in working with current mobile phone, tablet, laptop, web technologies): rrent European framework for the Digital competence DigComp and ECDL e effective learning, work and active life in higher education, later lifelong eareer prospects.					
Brief outline of the c 0102. Basic digital s - modern web browse - security, privacy, res 0305. Search, collect - scanning, audio reco - digital notebooks (C - evaluation of digital 0608. Editing and c - cloud and interactiv (text and spreadsheet - work with pdf docu (Kami, Google books 09 10. Organization - modern LMS and cl (Google Classroom, I - time management (C 1113. Digital comm	ourse: skills, DigComp framework, ECDL r and its personalization sponsible use of DT tion and evaluation of digital content ording and speech resolution, optical resolution (OCR) doogle keep, Evernote, Onenote) resources (Google forms and sections) reating digital content e documents editors - Google, Microsoft, Jupyter) ments, e-books and videos a, Screencasting) n, protection and sharing of digital content oud storage Microsoft team, Google Drive, Dropbox) Google Calendar) unication and cooperation					

- collaborative interactive whiteboards (Jamboard, Whiteboard)

- online presentations and online meetings

(Google presentations, Powerpoint, Google meet, Microsoft teams)

Recommended literature:

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, https://www.ecdl.sk/

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.

Course language:

slovak

Notes:

Notes:							
Course assessment							
Total number of assessed students: 160							
А	В	С	D	E	FX		
69.38	4.38	4.38	0.0	21.88	0.0		
Provides: doc. RNDr. Jozef Hanč, PhD.							
Date of last modification: 26.01.2022							
Approved: doc. RNDr. Ivan Potočňák, PhD.							

X						
University: P. J. Safárik University in Košice						
Faculty: Faculty of S	Faculty: Faculty of Science					
Course ID: ÚTVŠ/ LKSp/13	Course name: Summer Course-Rafting of TISA River					
Course type, scope a Course type: Practic Recommended cour Per week: 2 Per stu Course method: pre	nd the method: se se-load (hours): dy period: 28 sent					
Number of ECTS cro	edits: 2					
Recommended seme	ster/trimester of the course:					
Course level: I., II.						
Prerequisities:						
Conditions for cours Completion: passed Condition for success - active participation - effective performance paddling	e completion: ful course completion: in line with the study rule of procedure and course guidelines ce of all tasks: carrying a canoe, entering and exiting a canoe, righting a canoe,					
Learning outcomes: Content standard: The student demonstr course syllabus and re Performance standard Upon completion of t - implement the acqui - implement basic ski - determine the right s - prepare a suitable m	ates relevant knowledge and skills in the field, which content is defined in the ecommended literature. I: the course students are able to meet the performance standard and: ired knowledge in different situations and practice, lls to manipulate a canoe on a waterway, spot for camping, aterial and equipment for camping.					
Brief outline of the constraints of the constraints of the constraint of the constraints of the constraint of the constraints. Setting up a crew 4. Practical skills traints 5. Canoe lifting and constraints of the canoe lifting the canoe in the canoe in the canoe in the canoe of the pry stroke (on b) The draw stroke in the canoe of the canoe	burse: purse: iculty of waterways ting ning using an empty canoe arrying n the water without a shore contact e ut of the water fast waterways)					

11. Capsizing	
12. Commands	
Recommended literature: 1. JUNGER, J. et al. Turistika a športy v prír 8080680973. Internetové zdroje: 1. STEJSKAL, T. Vodná turistika. Prešov: P Dostupné na: https://ulozto.sk/tamhle/UkyxC ZGDjBGR2AQtkAzVkAzLkLJWuLwWxZ2	rode. Prešov: FHPV PU v Prešove. 2002. ISBN U v Prešove. 1999. Q2IYF8qh/name/Nahrane-7-5-2021-v-14-46-39#! 2ukBRLjnGqSomICMmOyZN==
Course language: Slovak language	
Notes:	
Course assessment Total number of assessed students: 209	
abs	n
37.32	62.68
Provides: Mgr. Dávid Kaško, PhD.	· · · ·
Date of last modification: 29.03.2022	
Approved: doc. RNDr. Ivan Potočňák, PhD.	

University: P. J. Šafá	rik University in Košice					
Faculty: Faculty of Science						
Course ID: ÚTVŠ/ KP/12	Course name: Survival Course					
Course type, scope a Course type: Practic Recommended cour Per week: 2 Per stu Course method: pre	nd the method: ce rse-load (hours): dy period: 28 esent					
Number of ECTS cr	edits: 2					
Recommended seme	ster/trimester of the course:					
Course level: I., II.						
Prerequisities:						
Conditions for cours Completion: passed Condition for success - active participation - effective performan	e completion: sful course completion: in line with the study rule of procedure and course guidelines, ce of all the tasks defined in the course syllabus					
Learning outcomes: Content standard: The student demonstricourse syllabus and r Performance standard Upon completion of the acquire knowledge - obtain theoretical kniconnected with surviv - be able to resist a environment, - be able implement children and youth w	rates relevant knowledge and skills in the field, which content is defined in the ecommended literature. 1: the course students are able to meet the performance standard and should: about safe stay and movement in natural environment, nowledge and practical skills to solve extraordinary and demanding situations val and minimization of damage to health, nd face situations related to overcoming barriers and obstacles in natural the acquired knowledge as an instructor during summer sport camps for ithin recreational sport.					
 Brief outline of the c Brief outline of the c Principles of condu Preparation and gu Objective and subj Principles of hygie Fire building Movement in the u Shelters Food preparation a Rappelling, Tyrolia Transport of an ir 	ourse: ourse: act and safety in the movement in unfamiliar natural environment idance of a hike tour ective danger in the mountains one and prevention of damage to health in extreme conditions infamiliar terrain, orientation and navigation and water filtering an traverse ajured person, first aid					

Recommended literature:

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.

n

53.99

PAVLÍČEK, J. Člověk v drsné přírodě. 3. vyd. Praha: Práh. 2002. ISBN 8072520598.
 WISEMAN, J. SAS: příručka jak přežít. Praha: Svojtka & Co. 2004. 566s. ISBN 8072372807.

Course language:

Slovak language

Notes:

Course assessment

Total number of assessed students: 439

abs 46.01

Provides: Mgr. Ladislav Kručanica, PhD.

Date of last modification: 16.05.2023

Approved: doc. RNDr. Ivan Potočňák, PhD.

University: P. J. Šafá	University: P. J. Šafárik University in Košice				
Faculty: Faculty of Science					
Course ID: ÚCHV/ FTEP1/03Course name: Theory of electrochemical processes					
Course type, scope a Course type: Lectur Recommended cour Per week: 2 / 1 Per Course method: pre	Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 2 / 1 Per study period: 28 / 14 Course method: present				
Number of ECTS credits: 5					
Recommended semester/trimester of the course: 6					

Course level: I., II.

Prerequisities:

Conditions for course completion:

1. Participation in seminars (also applies to the online form of teaching) and laboratory exercises. Students are required to attend seminars and laboratory exercises. The relevant teacher who leads the seminar or practical exercise will justify the student's justified non-participation (incapacity for work, family reasons, etc.) in a maximum of two seminars during the semester without the need for substitute performance. In the case of a longer-term justified absence (for example due to incapacity for work), the relevant teacher will assign the student an alternative form of mastering the missed material.

2. Activity at seminars and practical exercises. The preparation of students and their activity in seminars and exercises is always assessed by the relevant teacher who conducts the seminar or exercise, within his / her competence.

3. The exam is carried out in the form of a written test, resp. in case of restrictions of contact forms of the pedagogical process, the exam will be performed in a suitable distance - electronic form.

4. To successfully master the subject, it is necessary to prove mastery of the required curriculum at least 51%.

Learning outcomes:

To provide the students with knowledge on the basic theoretical principles, kinetics and mechanism of electrode and electrochemical processes and with selected experimental methods.

Brief outline of the course:

Fundamentals of electrochemical thermodynamics. Electrochemical potential and equilibrium at the electrode/solution interface. Electric double layer - fundamental models of the double layer structure. Adsorption phenomena at the electrode/solution interface. Fundamentals of electrochemical kinetics. Polarization curves and informations provided by them (charge transfer coefficient, heterogeneous rate constant). Influence of transport processes on electrode kinetics (convection, diffusion, migration). Reversibility of electrode reactions. Influence of the double layer structure on kinetics of electrode processes. Theory of electrolytic deposition.

Experimental methods for electrochemical kinetics (single pulse and multipulse potentiostatic methods, cyclic voltammetry with dc and dp scan, coulometry, chronopotentiometry). Spectroelectrochemistry. QCM

Recommended literature:

J.O'M. Bockris, A.K.N. Reddy: Modern Electrochemistry, Macdonald, London 2002

A.J. Bard, L.R. Faulkner: Electrochemical Methods, Fundamentals and Applications, John Wiley and Sons, New York 1980

J. Koryta, J. Dvořák, L. Kavan: Principles of Electrochemistry, John Wiley & Sons, New York 1993

E. Scholz (Ed.): Electroanalytical Methods, Guide to Experiments and Applications, Springer Vrlg., Berlin 2002

T. Engel, P. Reid: Physical Chemistry, Pearson Educat. Inc., San Francisco 2006

Course language:

Slovak language.

Notes:

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.

Course assessment

Total number of assessed students: 39

А	В	С	D	Е	FX
74.36	15.38	5.13	0.0	5.13	0.0

Provides: prof. RNDr. Renáta Oriňaková, DrSc., RNDr. Ján Macko, PhD., RNDr. Ivana Šišoláková, PhD., univerzitná docentka

Date of last modification: 12.11.2021

Approved: doc. RNDr. Ivan Potočňák, PhD.

University: P. J. Šafárik University in Košice						
Faculty: Faculty of Science						
Course ID: ÚCH ZRP/22	IV/ Course na	Course name: Základy regulačných procesov v biosystémoch				
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 2 / 2 Per study period: 28 / 28 Course method: present						
Number of ECTS credits: 5						
Recommended semester/trimester of the course: 3., 5.						
Course level: I.						
Prerequisities:						
Conditions for course completion:						
Learning outcomes:						
Brief outline of the course:						
Recommended literature:						
Course language:						
Notes:						
Course assessment Total number of assessed students: 0						
A	В	С	D	Е	FX	
0.0	0.0	0.0	0.0	0.0	0.0	
Provides: doc. RNDr. Viktor Víglaský, PhD., prof. Ing. Marián Antalík, DrSc., RNDr. Danica Sabolová, PhD., univerzitná docentka, RNDr. Nataša Tomášková, PhD., prof. RNDr. Erik Sedlák, DrSc., prof. RNDr. Mária Kožurková, CSc., doc. RNDr. Rastislav Varhač, PhD.						
Date of last modification: 19.11.2021						
Approved: doc. RNDr. Ivan Potočňák, PhD.						