CONTENT

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: CJP/ PFAJAKA/07	**Course name:** Academic 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 ECTS credits: 2

Recommended semester/trimester of the course:

Course level: I.

Prerequisities:

Conditions for course completion:
Active classroom participation, assignments handed in on time, 2 absences tolerated
1 test (13th week), no retake.
Presentation on chosen topic
Final evaluation- average assessment of test (50%), and presentation (50%).
Grading scale: A 93-100%, B 86-92%, C 79-85%, D 72-78%, E 65-71%, FX 64% and less

Learning outcomes:
The development of students´ language skills - reading, writing, listening, speaking, improvement of their linguistic competence - students acquire knowledge of selected phonological, lexical and syntactic aspects, development of pragmatic competence - students can efectively use the language for a given purpose, with focus on Academic English, level B2.

Brief outline of the course:
Formal and informal English
Academic English and its specific features
Key academic verbs and nouns
Linking words in academic writing, writing a paragraph, word-order, topic sentences
Word-formation - affixation
abstract
Selected aspects of English pronunciation, academic vocabulary
Selected functional grammar structures - defining, classifying, epressing opinion, cause-effect, paraphrasing

Recommended literature:
Seal B.: Academic Encounters, CUP, 2002
T. Armer :Cambridge English for Scientists, CUP 2011
M. McCarthy M., O´Dell F. - Academic Vocabulary in Use, CUP 2008
Zemach, D.E, Rumisek, L.A: Academic Writing, Macmillan 2005
Olsen, A. : Active Vocabulary, Pearson, 2013
www.bbclearningenglish.com
Cambridge Academic Content Dictionary, CUP, 2009

Course language:
English language, level B2 according to CEFR.

Notes:

Course assessment
Total number of assessed students: 435

A	B	C	D	E	FX
36.09	22.3	14.94	9.89	5.75	11.03

Provides: Mgr. Viktória Mária Slovenská

Date of last modification: 11.09.2024

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/PPB/03	**Course name:** Advanced Biochemistry Practical

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: 7

Recommended semester/trimester of the course: 6.

Course level: I.

Prerequisities: ÚCHV/BNK1/15 and ÚCHV/BNK2/15

Conditions for course completion:

Learning outcomes:
Deepening knowledge of the use of basic biochemical methods.

Brief outline of the course:
Advanced practice of biochemistry is closely connected to Practice of biochemistry. The focus of subject on the modern trends of molecular study of nucleic acids, various DNA-ligand and DNA-protein interactions.

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 156

A	B	C	D	E	FX
52.56	37.82	7.05	1.92	0.64	0.0

Provides: doc. RNDr. Viktor Víglaský, PhD., RNDr. Lukáš Trizna, PhD.

Date of last modification: 17.11.2021

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/PPA1/03	**Course name:** Advanced Practical from Inorganic Chemistry

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: 99

A	B	C	D	E	FX
94.95	4.04	1.01	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.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

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

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: doc. RNDr. Mariana Budovská, PhD., RNDr. Ján Elečko, PhD.

Date of last modification: 21.07.2022

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

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

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 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 supllying.
2. The assigned teacher, who leads the seminar, assesses the preparation of students and their activity in seminars. For the active participation in the exercises, the student can get a maximum of 50 points.
3. 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 chemsitry, 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. Volumetric analysis, principles and basic concepts. Calculations in volumetric 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

A	B	C	D	E	FX
6.56	14.21	25.68	31.42	19.67	2.46

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

Date of last modification: 15.11.2021

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ ANCH1a/21	**Course name:** Analytical chemistry I

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 supllying.
2. The assigned teacher, who leads the seminar, assesses the preparation of students and their activity in seminars. For the active participation in the exercises, the student can get a maximum of 50 points.
3. 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 acid-base 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: 46

A	B	C	D	E	FX
6.52	17.39	15.22	39.13	19.57	2.17

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

Date of last modification: 15.11.2021

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/BPO/14	**Course name:** Bachelor Thesis and its Defence

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:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:
Oral presentation of the thesis results. Answering questions of the thesis oponent or members of the state examination board.

Recommended literature:

Course language:
slovak

Notes:

Course assessment
Total number of assessed students: 271

A	B	C	D	E	FX
88.93	8.12	1.48	1.48	0.0	0.0

Provides:

Date of last modification: 07.12.2021

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

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

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

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

A	B	C	D	E	FX
40.0	22.17	18.26	10.43	8.26	0.87

Provides: doc. RNDr. Mariana Budovská, PhD.

Date of last modification: 21.07.2022

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ ZNCH/21	**Course name:** Basics of nanochemistry

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: 4

Recommended semester/trimester of the course: 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	B	C	D	E	FX
0.0	0.0	0.0	0.0	0.0	0.0

Provides: prof. RNDr. Vladimír Zeleňák, DrSc.

Date of last modification: 21.11.2021

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

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

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: 149

A	B	C	D	E	FX
81.88	16.11	0.67	0.67	0.0	0.67

Provides: doc. RNDr. Ivan Potočňák, PhD.

Date of last modification: 21.07.2022

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
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: 7

A	B	C	D	E	FX
71.43	28.57	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

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ BCH1a/03	**Course 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.

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. RNDr. Mária Kožurková, CSc., prof. RNDr. Erik Sedlák, DrSc.

Date of last modification: 18.11.2021

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ BCH1a/21	**Course name:** Biochemistry I

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: 4

Recommended semester/trimester of the course: 3.

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: 46

A	B	C	D	E	FX
28.26	26.09	15.22	15.22	15.22	0.0

Provides: prof. RNDr. Mária Kožurková, CSc., prof. RNDr. Erik Sedlák, DrSc., Mgr. Mária Tomková, PhD.

Date of last modification: 18.11.2021

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/BCH1b/10	**Course 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/BCHU/21 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 the 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: 397

A	B	C	D	E	FX
9.82	19.14	31.49	17.63	20.91	1.01

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.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

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

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: 492

A	B	C	D	E	FX
55.28	27.44	10.16	5.49	1.22	0.41

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

Date of last modification: 19.11.2021

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/BNK2/15	**Course name:** Biochemistry of Nucleic Acids II

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: 6.

Course level: I.

Prerequisities: ÚCHV/BNK1/15

Conditions for course completion:
Biochemistry of nucleic acids I exam.
Participation in lectures (also by distance learning).
The lecturer giving the lecture and the related seminar will excuse the student's absence (illness, family reasons, etc.) for a maximum of two lectures/seminars during the semester without additional substitution. In the case of a longer excused absence (e.g. due to illness), the student must demonstrate mastery of the missed material in an agreed manner; oral examination

Learning outcomes:
To provide students with more advanced practical and theoretical knowledge of DNA and its uses based on material provided in Biochemistry of Nucleic Acids I.

Brief outline of the course:
Basic principles of isolation and purification of nucleic acids and their characterization,
Gene engineering and enzymatic tools,
Preparation of recombinant DNA,
DNA amplification methods; PCR, RT PCR, SELEX, etc.,
Analyses of nucleic acids, DNA sequencing,
Applying of genetic manipulations.

Recommended literature:
J. Turňa a kol.: Rekombinantná DNA a biotechnológie
Sambrook a et al.: Molecular cloning - a laboratory manual

Course language:

Notes:

Course assessment
Total number of assessed students: 142

A	B	C	D	E	FX
25.35	26.76	22.54	21.83	3.52	0.0

Provides: doc. RNDr. Viktor Víglaský, PhD.

Date of last modification: 17.11.2021
Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

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

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, sexual transmission of genetic material. Heredity, inheritance disease, gene therapy. DNA transposition, 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: 263

A	B	C	D	E	FX
14.07	17.11	28.52	25.48	12.93	1.9

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: ÚCHV/ BAC1/04	**Course name:** Bioinorganic Chemistry I

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:
Test or seminar works
examination

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
Total number of assessed students: 386

A	B	C	D	E	FX
41.71	27.72	19.17	5.96	5.18	0.26

Provides: prof. RNDr. Zuzana Vargová, Ph.D.

Date of last modification: 28.10.2021
Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ BTC/04	**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 credits: 5

Recommended semester/trimester of the course: 6.

Course level: I.

Prerequisities:

Conditions for course completion:
Written test, from which the student must obtain at least 51 %.

Learning outcomes:
Students obtained the knowledge of basic biotechnological processes and their applications in agriculture, industry, enviromental technologies, food production and medicine.

Brief outline of the course:
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: 166

A	B	C	D	E	FX
34.34	28.31	22.89	10.84	3.01	0.6

Provides: RNDr. Danica Sabolová, PhD., univerzitná docentka

Date of last modification: 11.01.2022

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ ZCVU/04	**Course name:** Chemical Engineering

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., III.

Prerequisities:

Conditions for course completion:

Learning outcomes:

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

A	B	C	D	E	FX	N	P
22.73	54.55	13.64	4.55	0.0	0.0	0.0	4.55

Provides: prof. RNDr. Zuzana Vargová, Ph.D.

Date of last modification: 21.01.2022

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

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

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: 1805					
A	B	C	D	E	FX
26.81	19.0	21.99	19.39	11.58	1.22
Provides: doc. RNDr. Miroslav Almáši, PhD., Mgr. Nikolas Király, PhD.					
Date of last modification: 15.11.2021					
Approved: doc. RNDr. Ivan Potočňák, PhD.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ ISC1a/00	**Course name:** Cheminformatics I

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. 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:
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 of assessed students: 986

A	B	C	D	E	FX
74.24	7.1	10.75	5.78	1.32	0.81

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

Date of last modification: 11.08.2022

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ ISCH1b/03	**Course name:** Cheminformatics II

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. Students must obtain at least 51 percent of the total number of points within all 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 of assessed students: 110

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.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ BSS/14	**Course name:** Chemistry
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 transtion 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: 204

A	B	C	D	E	FX
38.24	25.98	18.14	9.31	6.86	1.47

Provides:

Date of last modification: 22.09.2021

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ PRCH1/10	**Course name:** Chemistry seminar I

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 1 **Per study period:** 14
Course method: present

Number of ECTS credits: 1

Recommended semester/trimester of the course: 1.

Course level: I.

Prerequisities:

Conditions for course completion:
1. Demonstration of knowledge of the nomenclature of inorganic and organic compounds.
2. Completion of 3 written works for a total 50 pts on the nomenclature of inorganic compounds with a success rate of min. 51% from each test.
3. Completion of 1x50 pts credit written work on the nomenclature of organic compounds with a success rate of min. 51%.
4. 100% participation in all seminars. For serious reasons, non-participation can be justified upon submission of confirmation.
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 students will become familiar with the basics of IUPAC nomenclature of inorganic and organic compounds.

Brief outline of the course:
1. Nomenclature of binary and pseudobinary compounds, acids, salts, double salts and coordination compounds.
2. Noenclature of alkanes, alkenes, alkynes, cyclic and aromatic hydrocarbons
3. Nomenclature of the basic heterocyclic compounds.
4. Nomenclature of halogen derivatives of hydrocarbons.
5. Nomenclature of hydroxy compounds and their derivatives.
6. Nomenclature of carbonyl compounds and their derivatives.
7. Nomenclature of carboxylic acids and their derivatives.
8. Nomenclature of organic nitrogen compounds.
9. Nomenclature of organic sulfur compounds.

Recommended literature:
M. Zikmund: Ako tvoriť názvy v anorganickej chémii, SPN 1995.
A. Sirota, E. Adamkovič, Názvoslovie anorganických látok, SPN, Bratislava, 2003.
Heger, J., Hnát, I., Putala, M.: Názvoslovie organických zlúčenín, SPN, Bratislava, 2004.
Putala, M., Sališová, M., Vencel, T.: Názvoslovie organických zlúčenín, Bratislava, 2015.

Course language:

slovak language

Notes:

Course assessment
Total number of assessed students: 667

A	B	C	D	E	FX
21.74	31.18	25.49	10.19	2.55	8.85

Provides: RNDr. Jana Špaková Raschmanová, PhD., Mgr. Michaela Rendošová, PhD.

Date of last modification: 21.11.2021

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: CJP/ PFAJKKA/07	**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 ECTS credits: 2

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 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%).
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 study materials.

Course language:
English language, B2-C1 level according to CEFR

Notes:

Course assessment
Total number of assessed students: 303

A	B	C	D	E	FX
45.21	21.12	17.49	7.59	5.94	2.64

Provides: Mgr. Barbara Mitríková, Mgr. Viktória Mária Slovenská

Date of last modification: 06.02.2025
Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: CJP/ PFAJGA/07	**Course name:** Communicative Grammar 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 ECTS credits: 2

Recommended semester/trimester of the course:

Course level: I.

Prerequisities:

Conditions for course completion:
Active classroom participation (maximum 2 absences tolerated), homework assignments completed by given deadlines.
Presentation of a topic related to the study field.
Final Test - end of semester, no retake
Final assessment = average of test and presentation.
Grading scale: A 93-100%, B 86-92%, C 79-85%, D 72-78%, E 65-71%, FX 64% and less

Learning outcomes:
The development of students´ language skills - reading, writing, listening, speaking, improvement of their communicative linguistic competence. Students acquire knowledge of selected phonological, lexical and syntactic aspects, development of pragmatic competence. Students can efectively use the language for a given purpose, with focus on Academic English and English on level B2.

Brief outline of the course:
Selected aspects of English grammar and pronunciation
Word formation
Contrast of tenses in English
The passive voice
Types of Conditionals
Phrasal verbs and English idioms
Words order and collocations, prepositional phrases

Recommended literature:
Vince M.: Macmillan Grammar in Context, Macmillan, 2008
McCarthy, O'Dell: English Vocabulary in Use, CUP, 1994
www.linguahouse.com
esllibrary.com
bbclearningenglish.com
ted.com/talks

Course language:

English language, level B2 according to CEFR.

Notes:

Course assessment
Total number of assessed students: 446

A	B	C	D	E	FX
41.48	19.51	15.7	7.85	5.61	9.87

Provides: Mgr. Viktória Mária Slovenská, Mgr. Lýdia Markovičová, PhD.

Date of last modification: 08.02.2025

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: KGER/ NJKG/07	**Course name:** Communicative Grammar in German Language

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.

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 language:
German, Slovak language

Notes:

Course assessment
Total number of assessed students: 58

A	B	C	D	E	FX
62.07	10.34	8.62	3.45	8.62	6.9

Provides: Mgr. Ulrika Strömplová, PhD.

Date of last modification: 13.08.2024

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚBEV/ CYTCH/22	**Course name:** Cytology for Chemists

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: 4

Recommended semester/trimester of the course: 1.

Course level: I.

Prerequisities:

Conditions for course completion:
Successful completition of two tests from the content of lectures. Written examination.

Learning outcomes:
To get acquainted of chemistry students with the microscopic, submicroscopic and partly molecular structure of eukaryotic cells and the relationship between the structure and function of individual cellular components.

Brief outline of the course:
Lectures:
1.) Cell theory. Cell. 2.) Organization of living systems. 3.) Biological membranes. 4.) Transfer of substances across membranes. 5.) Cell wall of plant cells. 6.) Surface structures of cells. Extracellular matrix. Cell movement. 7.) Intercellular connections. 8.) Cytoskeleton. 9.) Cell nucleus. 10.) Mitochondria and cellular metabolism. 11.) Plastids and vacuoles. 12.) Ribosomes. Endoplasmic reticulum. Golgi apparatus. Lysosomes. 13.) Differentiation, aging and cell death. Pathological changes in cells.

Recommended literature:
K.Kapeller, H.Strakele: Cytomorfológia. Osveta Martin, 1999
M.Babák, J.Šamaj: Cytológia. Univerzita Komenského Bratislava, 2002
Alberts B., Bray D., Johnson A., Lewis J.: Základy buněčné biologie. Espero Publishing, 2003
Campbell N. a Reece J.: Biologie. Computer Press, 2006
Kleban J., Mikeš J., Jendželovská Z., Jendželovský R., Fedoročko P.: Cytológia pracovný zošit na praktické cvičenia, 2018

Course language:

Notes:

Course assessment
Total number of assessed students: 77

A	B	C	D	E	FX
0.0	11.69	10.39	35.06	40.26	2.6

Provides: doc. RNDr. Rastislav Jendželovský, PhD.
Date of last modification: 19.02.2024
Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: CJP/ PFAJ4/07	**Course name:** English Language of Natural Science

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: 2.

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
Continuous assessment:
1 credit test taken presumably in weeks 6/7
1 project (quiz on the topic of the student´s field of study) 25% of the continuous assessment
5 LMS quizzes (25% of the continuous assessment)
In order to be admitted to the final exam, a student has to score at least 65 % from the continuous assessment
The exam test results represent 50% of the final grade for the course, continuous assessment results represent the other 50% of the final grade.
The final grade for the course will be calculated as follows:
A 93-100, B 86-92, C 79-85, D 72-78, E 65-71, FX 64 and less.

Learning outcomes:
Enhancement of students' language skills (speaking, writing, reading and listening comprehension) in English for specific and academic purposes and development of students' linguistic competence. Students obtain knowledge of selected phonological, lexical and syntactic aspects of professional English, improve their pragmatic competence - students can effectively use the language for a given purpose, and acquire presentation skills at B2 level (CEFR) with focus on terminology of natural sciences.

Brief outline of the course:
1. Introduction to studying language
2. Selected aspects of scientific language
3. Talking about academic study
4. Discussing science
5. Defining scientific terminology and concepts
6. Expressing cause and effect
7. Describing structures
8. Explaining processes
9. Comparing objects, structures and concepts

10. Talking about problem and solution
11. Referencing authors
12. Giving examples
13. Visual aids and numbers
14. Referencing time and place
Presentation topics related to students´study fields.

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: 3246

A	B	C	D	E	FX
38.63	26.31	16.3	9.52	7.18	2.06

Provides: Mgr. Viktória Mária Slovenská, Mgr. Lenka Klimčáková

Date of last modification: 06.02.2024

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ ECH1/08	**Course name:** Environmental 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.

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:
1. G. Schwedt: The Essential Guide to Environmental Chemistry, Wiley and Sons, London 2001
2. 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: 86

A	B	C	D	E	FX
72.09	18.6	4.65	2.33	2.33	0.0

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

Date of last modification: 18.11.2021

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

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

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: 112

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

Provides: doc. RNDr. Katarína Reiffová, PhD.

Date of last modification: 22.07.2022

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/VCH/10	**Course name:** General Chemistry

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: 10

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. Student must obtain together at least 2 points.
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 a percentage. Student must obtain at least 51% of at least one test.
Oral examination.

Learning outcomes:
To provide students with knowledge about atoms, chemical bonds, physical properties of elements and compounds.

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. Electrochemistry.

Recommended literature:
Atkins P., Jones L.: Chemical Principles, 2nd ed., Freeman, New York 2002.
Russel J.B.: General Chemistry, 2nd ed., McGraw Hill, London 1992.
Available literature in the library.

Course language:
Slovak and English

Notes:

Course assessment
Total number of assessed students: 834

A	B	C	D	E	FX
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. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

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

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: 557

A	B	C	D	E	FX
13.11	27.29	30.88	15.8	8.8	4.13

Provides: doc. RNDr. Juraj Kuchár, PhD., doc. RNDr. Ivan Potočňák, PhD.

Date of last modification: 21.07.2022

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ GAC/21	**Course name:** Green analytical chemisty and automatization

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 laboratory exercises and 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 green chemistry, miniaturization, and automation in analytical chemistry.

Brief outline of the course:
Green chemistry. Principles of green chemistry. Green Analytical Chemistry (GAC). Green instrumental techniques. Miniaturization and automation. Principles of individual methods of miniaturization and automation, instrumentation, advantages and disadvantages. Practical applications of procedures.

Recommended literature:
1. J. Labuda a kol. Analytická chémia, STU, Bratislava 2014.
2. Current periodical literature.
3. ANASTAS, P., WARNER J. C. Green Chemistry: Theory and Practice. Oxford: Oxford University Press. 1998.
4. KOLEV S.D., McKELVIE I.D. Advences in flow injection analysis and related techniqoues. Elsevier Wilson&Wilson's, USA, 2008.

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: 6

A	B	C	D	E	FX
16.67	50.0	33.33	0.0	0.0	0.0

Provides: prof. Mgr. Vasiľ Andruch, DSc., RNDr. Jana Šandrejová, PhD., univerzitná docentka

Date of last modification: 22.07.2022

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ ACPE1/03	**Course 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:

Conditions for course completion:
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

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 of assessed students: 167

A	B	C	D	E	FX
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.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ ISVTC/14	**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 credits: 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. 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 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:
1. 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.
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

A	B	C	D	E	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

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

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

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:
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. 2ndEd., Oxford University Press, Oxford, 1995

Course language:

Notes:

Course assessment
Total number of assessed students: 685

A	B	C	D	E	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

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

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

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:

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

Course language:

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

Course assessment
Total number of assessed students: 54

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

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

Date of last modification: 16.11.2021

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ ACH1/10	**Course name:** Inorganic chemistry

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: 472

A	B	C	D	E	FX
13.14	21.61	27.33	27.54	8.69	1.69

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

Date of last modification: 16.11.2021

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ ANCH1b/21	**Course name:** Instrumental Analytical Chemistry

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: 21

A	B	C	D	E	FX
19.05	33.33	14.29	9.52	23.81	0.0

Provides: prof. Mgr. Vasiľ Andruch, DSc.

Date of last modification: 15.07.2022

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ ANCH1b/03	**Course name:** Instrumental Analytical 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.

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

A	B	C	D	E	FX
19.9	13.16	22.47	19.26	24.88	0.32

Provides: prof. Mgr. Vasiľ Andruch, DSc.

Date of last modification: 22.07.2022

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ UVF/12	**Course name:** Introduction to General Physics for Chemist
Course type, scope and the method: **Course type:** Practice **Recommended course-load (hours):** **Per week:** 1 **Per study period:** 14 **Course method:** present	
Number of ECTS credits: 1	
Recommended semester/trimester of the course: 2.	
Course level: I.	
Prerequisities:	
Conditions for course completion: Knowledge of basic concepts from the fields of electricity, magnetism and optics is required. The student continuously acquires the curriculum during the semester, so that he can use them to solve numerical problems during the exercise. The condition for successful completion of the course is the elaboration of two written tests and obtaining at least 50% of the total evaluation.	
Learning outcomes: Acquire basic knowledge of electricity, magnetism and optics. The aim of the course is to supplement the knowledge from the subject Physics II. The course is recommended for chemistry students who complete the course ÚFV / CHF1b in a given school year.	
Brief outline of the course: 1.-2. Week: Introduction. Electrostatics. Forces in an electric field - Coulomb's law. Electric field strength. Week 3: Gauss's theorem. Electrostatic field work; potential, voltage. Week 4:. Conductor capacity, capacitors. Electric field energy. 4.-5. a week: . Ohm's law, conductor resistance. Kirchhoff's laws. Week 6: Work and power of electric current. 7.-9. week: Magnetic field. Magnetic field induction, Biott - Savart law. Week 10:. Ampere's and Lorentz's force. Week 11: Electromagnetic induction - Faraday's law. Week 12: Faraday's laws on electrolysis.	
Recommended literature: V. Hajko a kol. Fyzika v príkladoch, Alfa, Bratislava, 1983.	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 376

abs	n
96.01	3.99

Provides: Mgr. Tomáš Samuely, PhD., univerzitný docent, RNDr. Róbert Tarasenko, PhD.

Date of last modification: 17.09.2021

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ FUMCH1/03	**Course 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: 84

A	B	C	D	E	FX
90.48	8.33	0.0	0.0	0.0	1.19

Provides: prof. RNDr. Renáta Oriňaková, DrSc.

Date of last modification: 25.11.2021

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: Dek. PF UPJŠ/USPV/13	**Course name:** Introduction to Study of Sciences
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 credits: 2	
Recommended semester/trimester of the course: 1.	
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: 2369

abs	n
90.12	9.88

Provides: doc. RNDr. Marián Kireš, PhD.
Date of last modification: 30.08.2022
Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ MTCa/22	**Course name:** Mathematics I for chemists

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: 1.

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 mninimal 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:
Huťka, Benko, Ďurikovič: Matematika, Alfa, Bratislava 1991
D. Studenovská, T. Madaras, S. Mockovčiak: Zbierka úloh z matematiky pre nematematické odbory, UPJŠ 2006
D. Studenovská, T. Madaras: Matematika pre nematematické odbory, UPJŠ 2006
S. Lang: A First Course in Calculus, Springer Verlag, 1998

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 660

A	B	C	D	E	FX
11.52	11.21	16.06	21.21	28.03	11.97

Provides: RNDr. Jana Borzová, PhD., RNDr. Miriama Kmeciková

Date of last modification: 18.04.2022

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ MTCb/13	**Course name:** Mathematics II for chemists

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: 460

A	B	C	D	E	FX
13.26	15.43	17.83	24.35	26.3	2.83

Provides: doc. RNDr. Stanislav Lukáč, PhD., RNDr. Matej Slabý, PhD.

Date of last modification: 18.04.2022

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ GLP/12	**Course name:** Methodology of experiment. Fundamentals.

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.

Course level: I.

Prerequisities:

Conditions for course completion:
On the basis of ongoing evaluation, which requires the elaboration of seminar works and a final written project. In order to be admitted to the exam, after summing up, the continuous evaluation 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 course, the student will acquire knowledge in the area of:
statistical evaluation of the results,
interpretation of the results and methods,
the suitability of the chosen methods for analysis (or measurement),
estimation of uncertainties and validation of newly developed methods in research and laboratory practice.

Brief outline of the course:
Introduction and basics of statistical evaluation of experimental results.
The basic formulas used in the processing of the results of the chemical and biological experiments.
Distribution of the results of measurements, measures of central tendency and spread. Assessment of the precision, of accuracy, and reliability of the results.
Calibration in analytical chemistry.
Solving of the typical examples in the frame of the practical lectures.

Recommended literature:
Brereton R. G.: Chemometrics, Wiley, 2003
Harvey D.: Modern Analytical Chemistry, McGraw-Hill, 2000
J.N. Miller, J.C. Miller: Statistics and Chemometrics for Analytical Chemistry, Pearson Education Limited, 2010

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 of assessed students: 28

A	B	C	D	E	FX
39.29	28.57	14.29	0.0	17.86	0.0

Provides: doc. Ing. Viera Vojteková, PhD.

Date of last modification: 03.08.2022

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ MLAC/21	**Course name:** Modern laboratories of analytical chemistry

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 0 / 1 **Per study period:** 0 / 14
Course method: present

Number of ECTS credits: 1

Recommended semester/trimester of the course: 4.

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: 9

A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0

Provides: RNDr. Rastislav Serbin, PhD.

Date of last modification: 20.09.2021

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

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 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 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: 203

A	B	C	D	E	FX	N	P
28.57	23.15	24.14	12.81	6.9	0.99	0.0	3.45

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

Date of last modification: 25.07.2022

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ NATE/12	**Course name:** Nanotechology II

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: 4

Recommended semester/trimester of the course: 6.

Course level: I., II.

Prerequisities:

Conditions for course completion:
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.
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 inovative nanotechnology, nanoproducts, nanomaterials and processes. In connection on Nanotechnology the students will obtain advanced knowledges forced on appliocation in energy production and storage, nanocatalysis and microfluidistic.

Brief outline of the course:
Types of nanostructures. Nanomaterials and their application: nanoliquids, metallic nanomaterials, carbon nanomaterials, inorganic nanomaterials, composite nanomaterals, nanomaterals for electronics, biomedical nanomaterials. Nanotechnology today and in the future. Health hazards of nanotechnology.

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: 21

A	B	C	D	E	FX
80.95	19.05	0.0	0.0	0.0	0.0

Provides: prof. RNDr. Andrej Oriňak, PhD., prof. RNDr. Renáta Oriňaková, DrSc., doc. RNDr. Andrea Straková Fedorková, PhD.
Date of last modification: 25.07.2022
Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ JCH1/04	**Course name:** Nuclear 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: 6.

Course level: I., II.

Prerequisities:

Conditions for course completion:
Realization of practical exercises, without absence.
Elaboration of a project on a selected topic and its presentation.
Examination, each question must be answered at least 50%.

Learning outcomes:
Study of natural and artificial radioactivity, acquaintance with nuclear quantities and nuclear reactions. Gaining new knowledge about the preparation of radionuclides and labeled compounds and their use in technical practice and in general and physical chemistry. Overview of biological effects of nuclear radiation and practical use of nuclear medicine and nuclear chemistry in healthcare.

Brief outline of the course:
Fundamentals of nuclear chemistry. Elementary particles. Nuclear core. Nuclides and isotopes. Radioactivity and radioactive disintegration kinetics. Radioactive disintegration. Decay law. Half life period. Units of radioactivity. Nuclear reactions. Sources of nuclear radiation. Detection and registration of radiation. Nuclear chemical technology. Radioactive analytical methods. Isotopic dilution method, activation analysis. Biological effects of the nuclear radiation. Nuclear medicine. Nuclear power station.

Recommended literature:
G. R. Choppin, J. Rydberg: Nuclear Chemistry, Theory and Applications, Pergamon Press, 1980.
G. R. Choppin, J. O. Liljenzin, J. Rydberg: Radiochemistry and Nuclear Chemistry, 3rd edition, Woburn, USA, Butterworth-Heinemann, 2002.
W. D. Ehmann, D. E. Vance: Radiochemistry and Nuclear Methods of Analysis, Wiley, New York, 1991.
A. Vértes, I. Kiss: Nuclear Chemistry, Elsevier, 1987.

Course language:

Notes:
Teaching is carried out in person. If a distance form is required, the lectures will take place online, using the BigBlueButton tool (https://bbb.science.upjs.sk/). Other conditions will be specified by the teacher.

Course assessment
Total number of assessed students: 69

A	B	C	D	E	FX
49.28	27.54	13.04	5.8	2.9	1.45

Provides: 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.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/OP/14	**Course name:** Odborná prax
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 credits: 2	
Recommended semester/trimester of the course:	
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: 13

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.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ OP1/17	**Course name:** Odborná prax
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 credits: 2	
Recommended semester/trimester of the course:	
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: 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.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ OCH1a/10	**Course name:** Organic Chemistry I

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 Nucleophilile 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 Substiution vs. Elimination Substitution by Metals Elimination Reactions of Dihalides Alcohols Reactions of Alcohols Substitution of the Hydroxyl H Substitution of the Hydroxyl Group Elimination of Water Oxidation of Alcohols Reactions of Phenols Acidity of Phenols Ring Substitution of Phenols Oxidation to Quinones Aromatic compounds Electrophilic Substitution A Substitution Mechanism Reactions of Substituted Benzenes Reaction Characteristics Reactions of Disubstituted Rings Reactions of Substituent Groups Nucleophilic Substitution, Elimination & Addition Reactions Amines Basicity of Nitrogen Compounds Acidity of Nitrogen Compounds Important Reagent Bases Reactions of Amines Electrophilic Substitution at Nitrogen Preparation of 1°-Amines Preparation of 2° & 3°-Amines Reactions with Nitrous Acid Reactions of Aryl Diazonium Intermediates Elimination

Reactions of Amines Oxidation States of Nitrogen Basic information: Aldehydes & Ketones Carboxylic Acids 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: 884

A	B	C	D	E	FX
13.24	9.73	19.12	25.0	30.88	2.04

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

Date of last modification: 04.08.2022

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ POC1/03	**Course name:** Organic chemistry - Lab

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 assessment
Total number of assessed students: 517

A	B	C	D	E	FX
51.84	29.98	12.57	4.06	0.77	0.77

Provides: RNDr. Kvetoslava Stanková, PhD., RNDr. Jana Špaková Raschmanová, PhD., RNDr. Slávka Hamuľaková, PhD., univerzitná docentka, doc. RNDr. Mariana Budovská, PhD., RNDr. Ján Elečko, PhD.

Date of last modification: 09.01.2022

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

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

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

A	B	C	D	E	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

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ MOC1/00	**Course 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.
5. Aromatic nucleophilic substitutions, radical substitutions.
6. Electrophilic substitutions.
7. Additions.
8. Eliminations.
9. Pericyclic reactions.
10. Rearrangements.
11. Complex mechanisms of common reactions.

Recommended literature:
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

A	B	C	D	E	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

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

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

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: 45

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

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

Date of last modification: 04.08.2022

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

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

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

A	B	C	D	E	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, PhD., RNDr. Ivana Šišoláková, PhD., univerzitná docentka, RNDr. Martina Petráková, PhD., RNDr. Veronika Niščáková, PhD., RNDr. Viktória Čákyová
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: ÚCHV/ FCH1b/10	**Course name:** Physical Chemistry II

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. Trnasport 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: 623

A	B	C	D	E	FX
15.41	18.62	22.47	18.46	21.35	3.69

Provides: prof. RNDr. Renáta Oriňaková, DrSc., RNDr. Jana Shepa, PhD., RNDr. Radka Gorejová, PhD., RNDr. Viktória Čákyová, Mgr. Mária Paračková

Date of last modification: 25.11.2021

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ FCH1a/21	**Course name:** Physical chemistry I

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: 40

A	B	C	D	E	FX
10.0	20.0	30.0	22.5	12.5	5.0

Provides: prof. RNDr. Renáta Oriňaková, DrSc., Mgr. Mária Paračková, RNDr. Viktória Čákyová

Date of last modification: 25.11.2021

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ CHF1a/03	**Course name:** Physics I

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, DrSc., RNDr. Róbert Tarasenko, PhD., RNDr. Andrea Lachová, PhD.

Date of last modification: 03.05.2015

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ CHF1a/22	**Course name:** Physics I

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: 1.

Course level: I.

Prerequisities:

Conditions for course completion:
To successfully complete the course, the student must demonstrate sufficient knowledge of mechanics, molecular physics and thermodynamics.
The credit evaluation of the course takes into account the following student workload:
1 credits: direct teaching in lectures and numerical exercises, self-study of recommended literature, fulfillment of homework assignments
2 credits: successful mastery of numerical exercises and obtaining an A-E rating from two numerical papers in the 6th and 13th week of the semester
2 credits: obtaining the A-E evaluation from two theoretical papers in the 6th and 13th weeks of the semester and the evaluation for the oral exam.

Learning outcomes:
After completing the lectures and numerical exercises and after successfully passing the final exam, the student will demonstrate adequate mastery of the content standard of the course, which is defined by the brief content of the course and the recommended literature.
The result of education is:
a) Complementing and summarizing knowledge of mechanics, molecular physics and thermodynamics.
b) They will learn to apply the mastered subject matter to the numerical solution of relevant physical problems and problems.
c) Creates the necessary terminological and knowledge base for mastering related subjects.

Brief outline of the course:

Recommended literature:
1. Halliday D., Resnick R., Walker J.: Fyzika, VUTIUM Brno, 2000.
2. Krempasky J.: Fyzika, Veda Bratislava, 1982.
3. Hajko V., Daniel - Szabó J.: Základy fyziky, Veda, Bratislava 1983.
4. Horák Z., Krupka F.: Fyzika, SNTL a Alfa, Praha 1981.
5. Hajko V. a kol: Fyzika 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 of assessed students: 68

A	B	C	D	E	FX
20.59	29.41	17.65	23.53	8.82	0.0

Provides: doc. RNDr. Adriana Zeleňáková, DrSc.

Date of last modification: 30.09.2021

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ CHF1b/12	**Course name:** Physics 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: 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:
1. 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.
2. 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: 779

A	B	C	D	E	FX
10.91	16.17	24.13	22.46	16.17	10.14

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

Date of last modification: 22.09.2021

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ZP2/99	**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 ECTS credits: 3

Recommended semester/trimester of the course: 2.

Course level: I.

Prerequisities:

Conditions for course completion:

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 course:
The goal of this laboratory exercises is to familialize the students with measurement metods, with kinds and calculus of mistakes, with measured results processing, and with presentation of results. Students selected for practical tasks completed and verified knowledge of mechanics and molecular physics, electricity and magnetism, and optics.

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 language:

Notes:

Course assessment
Total number of assessed students: 547

A	B	C	D	E	FX
40.95	34.55	20.48	2.56	0.91	0.55

Provides: doc. RNDr. Ján Füzer, PhD., RNDr. Róbert Tarasenko, PhD.

Date of last modification: 18.11.2021

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/PACH/03	**Course name:** Practical from Inorganic Chemistry

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: 2.

Course level: I.

Prerequisities: ÚCHV/CHV1/99

Conditions for course completion:
test
Results from reports, tests. Achieved practical abilities.

Learning outcomes:
The practical acquirements at preparation and study of inorganic compounds and their physico-chemical properties by common laboratory techniques.

Brief outline of the course:
The utilization of common laboratory techniques and also the work in anaerobic, inert and non-aqueous conditions at preparation of elements (H2, O2, Cu, Ni), oxides(CO2, Al2O3·xH2O), nitrides(Mg3N2), acids (HNO3, H3BO3), salts((NH4)2SO4, KMnO4), binary salts(NH4)Fe(SO4)2·12H2O), halides (CuCl, CuCl2·2H2O, SnI4, CuBr2) and coordination compounds ([Cr2(CH3COO)4(H2O)2], [CoCl2(en)2]Cl, [Cu(NH3)4]SO4·H2O, K3[Al(C2O4)3]·3H2O).

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 543

A	B	C	D	E	FX
57.46	33.89	5.34	2.03	1.1	0.18

Provides: prof. RNDr. Zuzana Vargová, Ph.D., doc. RNDr. Juraj Kuchár, PhD., doc. RNDr. Miroslav Almáši, PhD., Mgr. Nikolas Király, PhD.

Date of last modification: 28.10.2021

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ PANCH/06	**Course name:** Practical in Analytical Chemistry

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.
2. The assigned teacher, who leads the seminar, assesses the preparation of students and their activity in seminars. For the active participation in the exercises, the student can get a maximum of 10 points.
3. Two written tests are obligatory. The written test will consist of 15 questions with 15 points, together for 2 written testes of 30 points. To successful completion of the exam, it is necessary to achieve at least 8 points from each test.
Overall score: Max. number of points: 50 (elaboration of protocols / assignments - 10 points; active participation in practical exercises - 10 points; written tests - 2 × 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.Meľuch: Praktikum z analytickej chémie, PF UPJŠ, Košice 1988.
4. J. Labuda a kol. Analytická chémia, STU, Bratislava 2014.
5. Z. Holzbecher a kol: Analytická chemie, SNTL, ALFA Praha 1987.

6. L. Koller: Analytická chémia, TU Košice, 2002, skriptum a v digitálnej forme.
7. D. Harvey: Modern Analytical Chemistry. McGraw Hill, Boston, 2000.

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: 493

A	B	C	D	E	FX
56.8	23.53	15.01	2.43	2.23	0.0

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

Date of last modification: 15.11.2021

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

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

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.
<p>
In the case of distance learning:
1. Elaboration of a paper on a selected topic and its presentation.
2. Theoretical preparation in the form of protocols, where the basic principles of individual tasks are stated.
3. Teaching is realized in blocks without limiting the scope in the alternative term.

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.

Course assessment
Total number of assessed students: 464

A	B	C	D	E	FX
69.61	21.77	6.25	0.86	1.51	0.0

Provides: RNDr. František Kaľavský, RNDr. Jana Shepa, PhD.

Date of last modification: 22.07.2022

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ PRCH2u/10	**Course name:** Proseminár z chémie II

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 0 / 1 **Per study period:** 0 / 14
Course method: present

Number of ECTS credits: 1

Recommended semester/trimester of the course: 2.

Course level: I.

Prerequisities: ÚCHV/VCHU/10

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 1

A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0

Provides: RNDr. Martin Vavra, PhD., doc. RNDr. Juraj Kuchár, PhD.

Date of last modification:

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚTVŠ/ CM/13	**Course 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:
1. Basic aerobics – low impact aerobics, high impact aerobics, basic steps and cuing
2. Basics of aqua fitness
3. Basics of Pilates
4. Health exercises
5. Bodyweight exercises
6. Swimming
7. Relaxing yoga exercises
8. Power yoga
9. Yoga relaxation
10. 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.

2. ČECHOVSKÁ, I., MILEROVÁ, H., NOVOTNÁ, V. Aqua-fitness. Praha: Grada. 136 s.
3. EVANS, M ., HUDSON, J., TUCKER, P. 2001. Umění harmonie: meditace, jóga, tai-či, strečink. 192 s.
4. JARKOVSKÁ, H., JARKOVSKÁ, M. 2005. Posilováni s vlastním tělem 417 krát jinak. Praha: Grada. 209 s.
5. KOVAŘÍKOVÁ, K. 2017. Aerobik a fitness. Karolium, 130 s.

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 62

abs	n
9.68	90.32

Provides: Mgr. Agata Dorota Horbacz, PhD.

Date of last modification: 29.03.2022

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

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

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 assessment
Total number of assessed students: 506

A	B	C	D	E	FX
28.66	26.09	25.1	12.65	5.34	2.17

Provides: doc. RNDr. Taťána Gondová, CSc.

Date of last modification: 01.08.2022

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ASC1/99	**Course name:** Separation Methods Practicals

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 ECTS credits: 5

Recommended semester/trimester of the course: 6.

Course level: I.

Prerequisities: ÚCHV/ASM/03

Conditions for course completion:
1.Take part in all exercises.
2. Assessment is based on active participation in all exercises according to the schedule and submitted protocols from individual tasks.

Learning outcomes:
To obtain practical experiences for applications of separation methods in analytical 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: 149

A	B	C	D	E	FX
89.26	10.07	0.67	0.0	0.0	0.0

Provides: doc. RNDr. Taťána Gondová, CSc.

Date of last modification: 15.11.2021

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚTVŠ/ TVa/11	**Course name:** Sports Activities I.

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., II.

Prerequisities:

Conditions for course completion:
Min. 80% of active participation in classes.

Learning outcomes:
Sports activities in all their forms prepare university students for their professional and personal life. They have a great impact on physical fitness and performance. Specialization in sports activities enables students to strengthen their relationship towards the selected sport in which they also improve.

Brief outline of the course:
Brief outline of the course:
The Institute of physical education and sport at the Pavol Jozef Šafárik University offers 20 sports activities aerobics; aikido, basketball, badminton, body-balance, body form, bouldering, floorball, yoga, power yoga, pilates, swimming, fitness, indoor football, SM system, step aerobics, table tennis, chess, volleyball, tabata, cycling.
Additionally, the Institute of physical education and sport at the Pavol Jozef Šafárik University offers winter courses (ski course, survival) and summer courses (aerobics by the sea, rafting on the Tisza River) with an attractive programme, sports competitions with national and international participation.

Recommended literature:
BENCE, M. et al. 2005. Plávanie. Banská Bystrica: FHV UMB. 198s. ISBN 80-8083-140-8. [online] Dostupné na: https://www.ff.umb.sk/app/cmsFile.php?disposition=a&ID=571
BUZKOVÁ, K. 2006. Fitness jóga, harmonické cvičení těla I duše. Praha: Grada. ISBN 8024715252.
JARKOVSKÁ, H, JARKOVSKÁ, M. 2005. Posilování s vlastním tělem 417 krát jinak. Praha: Grada. ISBN 9788024757308.
KAČÁNI, L. 2002. Futbal:Tréning hrou. Bratislava: Peter Mačura – PEEM. 278s. ISBN 8089197027.
KRESTA, J. 2009. Futsal.Praha: Grada Publishing, a.s. 112s. ISBN 9788024725345.
LAWRENCE, G. 2019. Power jóga nejen pro sportovce. Brno: CPress. ISBN 9788026427902.
SNER, Wolfgang. 2004. Posilování ve fitness. České Budějovice: Kopp. ISBN 8072322141.

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

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 15781

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

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

Date of last modification: 07.02.2024

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚTVŠ/ TVb/11	**Course name:** Sports Activities II.

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: 2.

Course level: I., II.

Prerequisities:

Conditions for course completion:
active participation in classes - min. 80%.

Learning outcomes:
Sports activities in all their forms prepare university students for their professional and personal life. They have a great impact on physical fitness and performance. Specialization in sports activities enables students to strengthen their relationship towards the selected sport in which they also improve.

Brief outline of the course:
Brief outline of the course:
The Institute of physical education and sport at the Pavol Jozef Šafárik University offers 20 sports activities aerobics; aikido, basketball, badminton, body-balance, body form, bouldering, floorball, yoga, power yoga, pilates, swimming, fitness, indoor football, SM system, step aerobics, table tennis, chess, volleyball, tabata, cycling.
Additionally, the Institute of physical education and sport at the Pavol Jozef Šafárik University offers winter courses (ski course, survival) and summer courses (aerobics by the sea, rafting on the Tisza River) with an attractive programme, sports competitions with national and international participation.

Recommended literature:
BENCE, M. et al. 2005. Plávanie. Banská Bystrica: FHV UMB. 198s. ISBN 80-8083-140-8. [online] Dostupné na: https://www.ff.umb.sk/app/cmsFile.php?disposition=a&ID=571
BUZKOVÁ, K. 2006. Fitness jóga, harmonické cvičení těla I duše. Praha: Grada. ISBN 8024715252.
JARKOVSKÁ, H, JARKOVSKÁ, M. 2005. Posilování s vlastním tělem 417 krát jinak. Praha: Grada. ISBN 9788024757308.
KAČÁNI, L. 2002. Futbal:Tréning hrou. Bratislava: Peter Mačura – PEEM. 278s. ISBN 8089197027.
KRESTA, J. 2009. Futsal.Praha: Grada Publishing, a.s. 112s. ISBN 9788024725345.
LAWRENCE, G. 2019. Power jóga nejen pro sportovce. Brno: CPress. ISBN 9788026427902.
SNER, Wolfgang. 2004. Posilování ve fitness. České Budějovice: Kopp. ISBN 8072322141.

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

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 13799

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

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

Date of last modification: 07.02.2024

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚTVŠ/ TVc/11	**Course name:** Sports Activities III.

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: 3.

Course level: I., II.

Prerequisities:

Conditions for course completion:
min. 80% of active participation in classes

Learning outcomes:
Sports activities in all their forms prepare university students for their professional and personal life. They have a great impact on physical fitness and performance. Specialization in sports activities enables students to strengthen their relationship towards the selected sport in which they also improve.

Brief outline of the course:
Brief outline of the course:
The Institute of physical education and sport at the Pavol Jozef Šafárik University offers 20 sports activities aerobics; aikido, basketball, badminton, body-balance, body form, bouldering, floorball, yoga, power yoga, pilates, swimming, fitness, indoor football, SM system, step aerobics, table tennis, chess, volleyball, tabata, cycling.
Additionally, the Institute of physical education and sport at the Pavol Jozef Šafárik University offers winter courses (ski course, survival) and summer courses (aerobics by the sea, rafting on the Tisza River) with an attractive programme, sports competitions with national and international participation.

Recommended literature:
BENCE, M. et al. 2005. Plávanie. Banská Bystrica: FHV UMB. 198s. ISBN 80-8083-140-8. [online] Dostupné na: https://www.ff.umb.sk/app/cmsFile.php?disposition=a&ID=571
BUZKOVÁ, K. 2006. Fitness jóga, harmonické cvičení těla I duše. Praha: Grada. ISBN 8024715252.
JARKOVSKÁ, H, JARKOVSKÁ, M. 2005. Posilování s vlastním tělem 417 krát jinak. Praha: Grada. ISBN 9788024757308.
KAČÁNI, L. 2002. Futbal:Tréning hrou. Bratislava: Peter Mačura – PEEM. 278s. ISBN 8089197027.
KRESTA, J. 2009. Futsal.Praha: Grada Publishing, a.s. 112s. ISBN 9788024725345.
LAWRENCE, G. 2019. Power jóga nejen pro sportovce. Brno: CPress. ISBN 9788026427902.
SNER, Wolfgang. 2004. Posilování ve fitness. České Budějovice: Kopp. ISBN 8072322141.

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

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 9334

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

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

Date of last modification: 07.02.2024

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚTVŠ/ TVd/11	**Course name:** Sports Activities IV.

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: 4.

Course level: I., II.

Prerequisities:

Conditions for course completion:
min. 80% of active participation in classes

Learning outcomes:
Sports activities in all their forms prepare university students for their professional and personal life. They have a great impact on physical fitness and performance. Specialization in sports activities enables students to strengthen their relationship towards the selected sport in which they also improve.

Brief outline of the course:
Brief outline of the course:
The Institute of physical education and sport at the Pavol Jozef Šafárik University offers 20 sports activities aerobics; aikido, basketball, badminton, body-balance, body form, bouldering, floorball, yoga, power yoga, pilates, swimming, fitness, indoor football, SM system, step aerobics, table tennis, chess, volleyball, tabata, cycling.
Additionally, the Institute of physical education and sport at the Pavol Jozef Šafárik University offers winter courses (ski course, survival) and summer courses (aerobics by the sea, rafting on the Tisza River) with an attractive programme, sports competitions with national and international participation.

Recommended literature:
BENCE, M. et al. 2005. Plávanie. Banská Bystrica: FHV UMB. 198s. ISBN 80-8083-140-8. [online] Dostupné na: https://www.ff.umb.sk/app/cmsFile.php?disposition=a&ID=571
BUZKOVÁ, K. 2006. Fitness jóga, harmonické cvičení těla I duše. Praha: Grada. ISBN 8024715252.
JARKOVSKÁ, H, JARKOVSKÁ, M. 2005. Posilování s vlastním tělem 417 krát jinak. Praha: Grada. ISBN 9788024757308.
KAČÁNI, L. 2002. Futbal:Tréning hrou. Bratislava: Peter Mačura – PEEM. 278s. ISBN 8089197027.
KRESTA, J. 2009. Futsal.Praha: Grada Publishing, a.s. 112s. ISBN 9788024725345.
LAWRENCE, G. 2019. Power jóga nejen pro sportovce. Brno: CPress. ISBN 9788026427902.
SNER, Wolfgang. 2004. Posilování ve fitness. České Budějovice: Kopp. ISBN 8072322141.

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

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 5845

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
82.53	0.27	0.03	0.0	0.0	0.0	8.25	8.91

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

Date of last modification: 07.02.2024

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ ST/03	**Course name:** Stereochemistry

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:
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 stereochemistry of molecules. Determination of relative and absolute configuration. Relationship between stereochemistry and structure of molecules, energy, physical and spectral properties.

Brief outline of the course:
Stereochemistry - basic principles. Isomerism, Configuration and Conformation Isomers. Properties of Stereoisomers. Conformation and reactivity of Alkanes and Cycloalkanes. Absolute and relative Configuration. Chirality and Symmetry, Enantiomers, Diastereoisomers. Epimerization, mutarotation. Determination of Enantiomer and Diastereoisomer Composition. Separation of Stereoisomers. Topism, prochirality. Stereochemistry of natural compounds, Stereochemistry of Carbohydrates. Stereoselective synthesis-basic principles.

Recommended literature:
1. Eliel L. E.,Wilen S. E., Stereochemistry of Organic Compounds, Wiley, 1994.
2. László Poppe L, Nógrádi M., Stereochemistry and Stereoselective Synthesis, Wiley-VCH, 2016.

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: 202

A	B	C	D	E	FX
68.81	12.38	10.4	2.48	5.94	0.0

Provides: RNDr. Monika Tvrdoňová, PhD.

Date of last modification: 04.08.2022

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

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

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 assessment
Total number of assessed students: 622

A	B	C	D	E	FX
19.61	28.46	29.58	18.65	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.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

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

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:

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., Segľa P.: Vybrané metódy molekulovej spektroskopie. STU BA, 2007.
3. Milata V., Segľa P.: Spektrálne metódy v chémii. STU FCHPT Bratislava 2002.
4. Miertuš S. a kol.: Atómová a molekulová spektroskopia, ALFA, Bratislava 1991.
5. T. D. W. Claridge: High-Resolution NMR Techniques in Organic Chemistry, 5. Ed., Elsevier, 2016.

Course language:

slovak

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: 19

A	B	C	D	E	FX
52.63	31.58	5.26	10.53	0.0	0.0

Provides: doc. RNDr. Juraj Kuchár, PhD., RNDr. Monika Tvrdoňová, PhD., RNDr. Zuzana Kudličková, PhD.

Date of last modification: 07.11.2022

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ SVKB/04	**Course name:** Students Scientific Conference

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: 6.

Course level: I.

Prerequisities:

Conditions for course completion:
Present the results of student's work at the Student Scientific Conference and answer questions from committee members and others present.

Learning outcomes:
The student will acquire competences for independent scientific work in the laboratory, for analysis and written processing of obtained results and knowledge. By presenting the obtained results, the student prepares to present the obtained results in the defense of the bachelor's thesis and in front of the professional public at scientific conferences.

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 12

abs	n
100.0	0.0

Provides:

Date of last modification: 22.07.2022

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ DGS/21	**Course name:** Students` Digital Literacy

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:
Summary evaluation based on ongoing assessment:
1. Practical ongoing assignments and their defense (at least 50% needed)
3. Active participation during face-to-face contact learning in classical or virtual classroom (3 absences allowed) and during online learning (no absence, uploading all individual ongoing assignments)

Learning outcomes:
The student should obtain and know to apply basic knowledge and skills in working with current digital technologies (mobile phone, tablet, laptop, web technologies):
1. according to the current European framework for the Digital competence DigComp and ECDL
2. for better and more effective learning, work and active life in higher education, later lifelong learning and further career prospects.

Brief outline of the course:
01.-02. Basic digital skills, DigComp framework, ECDL
- modern web browser and its personalization
- security, privacy, responsible use of DT
03.-05. Search, collection and evaluation of digital content
- scanning, audio recording and speech resolution, optical resolution (OCR)
- digital notebooks (Google keep, Evernote, Onenote)
- evaluation of digital resources (Google forms and sections)
06.-08. Editing and creating digital content
- cloud and interactive documents
(text and spreadsheet editors - Google, Microsoft, Jupyter)
- work with pdf documents, e-books and videos
(Kami, Google books, Screencasting)
09. - 10. Organization, protection and sharing of digital content
- modern LMS and cloud storage
(Google Classroom, Microsoft team, Google Drive, Dropbox)
- time management (Google Calendar)
11.-13. Digital communication and cooperation

- collaborative interactive whiteboards (Jamboard, Whiteboard)
- online presentations and online meetings
(Google presentations, Powerpoint, Google meet, Microsoft teams)

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:

Course assessment
Total number of assessed students: 245

A	B	C	D	E	FX
76.33	5.31	2.86	0.0	14.69	0.82

Provides: doc. RNDr. Jozef Hanč, PhD.

Date of last modification: 26.01.2022

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚTVŠ/ LKSp/13	**Course name:** Summer Course-Rafting of TISA River

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: carrying a canoe, entering and exiting a canoe, righting a canoe, paddling

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:
- implement the acquired knowledge in different situations and practice,
- implement basic skills to manipulate a canoe on a waterway,
- determine the right spot for camping,
- prepare a suitable material and equipment for camping.

Brief outline of the course:
Brief outline of the course:
1. Assessment of difficulty of waterways
2. Safety rules for rafting
3. Setting up a crew
4. Practical skills training using an empty canoe
5. Canoe lifting and carrying
6. Putting the canoe in the water without a shore contact
7. Getting in the canoe
8. Exiting the canoe
9. Taking the canoe out of the water
10. Steering
a) The pry stroke (on fast waterways)
b) The draw stroke

11. Capsizing
12. Commands

Recommended literature:
1. JUNGER, J. et al. Turistika a športy v prírode. Prešov: FHPV PU v Prešove. 2002. ISBN 8080680973.
Internetové zdroje:
1. STEJSKAL, T. Vodná turistika. Prešov: PU v Prešove. 1999.
Dostupné na: https://ulozto.sk/tamhle/UkyxQ2lYF8qh/name/Nahrane-7-5-2021-v-14-46-39#!ZGDjBGR2AQtkAzVkAzLkLJWuLwWxZ2ukBRLjnGqSomICMmOyZN==

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 232

abs	n
36.64	63.36

Provides: Mgr. Dávid Kaško, PhD.

Date of last modification: 29.03.2022

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚTVŠ/ KP/12	**Course name:** Survival Course

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 the tasks defined in the course syllabus

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 should:
- acquire knowledge about safe stay and movement in natural environment,
- obtain theoretical knowledge and practical skills to solve extraordinary and demanding situations connected with survival and minimization of damage to health,
- be able to resist and face situations related to overcoming barriers and obstacles in natural environment,
- be able implement the acquired knowledge as an instructor during summer sport camps for children and youth within recreational sport.

Brief outline of the course:
Brief outline of the course:
1. Principles of conduct and safety in the movement in unfamiliar natural environment
2. Preparation and guidance of a hike tour
3. Objective and subjective danger in the mountains
4. Principles of hygiene and prevention of damage to health in extreme conditions
5. Fire building
6. Movement in the unfamiliar terrain, orientation and navigation
7. Shelters
8. Food preparation and water filtering
9. Rappelling, Tyrolian traverse
10. Transport of an injured person, first aid

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

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 461

abs	n
46.2	53.8

Provides: Mgr. Ladislav Kručanica, PhD.

Date of last modification: 16.05.2023

Approved: doc. RNDr. Ivan Potočňák, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ FTEP1/03	**Course name:** Theory of electrochemical processes

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: 40

A	B	C	D	E	FX
75.0	15.0	5.0	0.0	5.0	0.0

Provides: prof. RNDr. Renáta Oriňaková, DrSc.

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: ÚCHV/ZRP/22	**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	B	C	D	E	FX
0.0	0.0	0.0	0.0	0.0	0.0

Provides: doc. RNDr. Viktor Víglaský, PhD., 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.