

CONTENT

1. Academic English.....	3
2. Alternative Education.....	5
3. Analytical Chemistry.....	6
4. Bachelor Project.....	7
5. Bachelor Project.....	8
6. Bachelor State Exam Physics.....	9
7. Bachelor Thesis and its Defence.....	10
8. Bachelor Thesis and its Defence.....	11
9. Basis of Mineralogy.....	12
10. Biochemistry.....	14
11. Biochemistry Practical.....	16
12. Bioinorganic Chemistry I.....	18
13. Biology of Children and Adolescents.....	20
14. Chemical calculations.....	21
15. Cheminformatics I.....	23
16. Chemistry.....	25
17. Civil Law and Intellectual Property Rights.....	26
18. Communicative Competence in English.....	27
19. Communicative Grammar in English.....	29
20. Communicative Grammar in German Language.....	31
21. Computational Physics I.....	33
22. Computer-Based Physical Measurement.....	35
23. Coordination Chemistry.....	37
24. Drug Addiction Prevention in University Students.....	39
25. Educational software.....	41
26. Electronics Practical.....	43
27. Electronics.....	45
28. English Language of Natural Science.....	47
29. Food chemistry.....	49
30. Fundamentals of Bioanalytical Chemistry.....	50
31. General Biophysics I.....	52
32. General Chemistry.....	55
33. General Course of Analytical Chemistry - Laboratory.....	56
34. General Physics I.....	58
35. General Physics II.....	60
36. General Physics III.....	62
37. General Physics IV.....	64
38. History of Philosophy 2 (General Introduction).....	66
39. Inclusive Pedagogy.....	68
40. Inorganic Chemistry.....	69
41. Inorganic Chemistry II.....	71
42. Instrumental Analytical Chemistry.....	72
43. Introduction to Astronomy.....	74
44. Introduction to Environmental Chemistry.....	76
45. Introduction to General Physics.....	78
46. Introduction to General Physics II.....	80
47. Introduction to Mathematics for Physicists.....	82
48. Introduction to Study of Sciences.....	83

49. Mathematics I for physicists.....	84
50. Mathematics II for physicists.....	86
51. Methods of Data Processing in Physics.....	88
52. Methods of Physical Problems Solving.....	90
53. Modern Trends in Physics.....	92
54. Multiculturalism and Multicultural Education.....	94
55. Organic chemistry.....	95
56. Organic chemistry - Lab.....	97
57. Organic chemistry II.....	99
58. Pedagogy.....	101
59. Physical Chemistry.....	102
60. Physical Chemistry II.....	104
61. Physics Practical I.....	106
62. Physics Practical II.....	108
63. Physics Practical III.....	110
64. Physics Practical IV.....	112
65. Physics in Demonstration Experiments.....	114
66. Porous materials and their applications.....	115
67. Positive Psychology.....	117
68. Practical from Inorganic Chemistry.....	119
69. Practical in Physical Chemistry.....	121
70. Psychology.....	123
71. Psychology of Everyday Life.....	124
72. Quantum Mechanics I.....	126
73. School Administration and Legislation.....	128
74. Seaside Aerobic Exercise.....	129
75. Selected Topics in Philosophy of Education (General Introduction).....	131
76. Separation Methods.....	132
77. Social and Political Context of Education.....	134
78. Specialised German Language - Natural Sciences I.....	136
79. Sports Activities I.....	138
80. Sports Activities II.....	140
81. Sports Activities III.....	142
82. Sports Activities IV.....	144
83. Statistical Physics.....	146
84. Structure and Properties of Solids.....	147
85. Structure determination - spectroscopic methods.....	149
86. Students Scientific Conference (Presentation).....	151
87. Students` Digital Literacy.....	152
88. Summer Course-Rafting of TISA River.....	154
89. Theoretical Mechanics.....	156
90. Theory of Education.....	158
91. Theory of the Electromagnetic Field.....	159

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: combined, present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course:	
Course level: I., II., N	
Prerequisites:	
Conditions for course completion: Active classroom participation, assignments handed in on time, 2 absences tolerated 1 test (10th week), no retake. Presentation on chosen topic Final evaluation- average assessment of test (40%), essay (30%) and presentation (30%). 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 effectively 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, expressing 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: 400					
A	B	C	D	E	FX
34.75	22.0	15.75	9.5	6.25	11.75
Provides: Mgr. Viktória Mária Slovenská					
Date of last modification: 19.09.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: KPE/ ALP/06		Course name: Alternative Education			
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.					
Prerequisites:					
Conditions for course completion:					
Learning outcomes:					
Brief outline of the course:					
Recommended literature:					
Course language:					
Notes:					
Course assessment Total number of assessed students: 318					
A	B	C	D	E	FX
69.18	25.16	2.83	0.63	0.31	1.89
Provides: Mgr. Katarína Petříková, PhD.					
Date of last modification: 20.06.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: ÚCHV/ ANCHU/21		Course name: Analytical Chemistry			
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: 3.					
Course level: I.					
Prerequisites:					
Conditions for course completion: 1. 3x test of analytical calculations (each 33%, minim. 50%). 2. Examination is composed of 3 questions (each for 33%, it is necessary to reach at least 50%).					
Learning outcomes: Survey of basic principles and tasks of analytical chemistry and applications of analytical methods in research and practice.					
Brief outline of the course: Subject and role of analytical chemistry. General principles and procedures - sampling, sample pre-treatment. Preparation of solutions. Evaluation of the results. Classification of analytical reactions. Qualitative analysis of cations and anions. Basic principles of organic analysis. Methods of quantitative analysis. General principles of gravimetry. Volumetric analysis. Instrumental methods of analytical chemistry (basic principles, instrumentation and applications) - electroanalytical, optical and separation methods.					
Recommended literature: D. Harvey, Modern Analytical Chemistry. McGraw Hill, Boston, 2000 Skoog D.A., Principles of Instrumental Analysis. Saunders Col. Publishing, New York 1985					
Course language:					
Notes:					
Course assessment Total number of assessed students: 50					
A	B	C	D	E	FX
30.0	20.0	20.0	18.0	8.0	4.0
Provides: doc. RNDr. Taťána Gondová, CSc.					
Date of last modification: 12.11.2021					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ BKP/21	Course name: Bachelor Project
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 6	
Recommended semester/trimester of the course: 5.	
Course level: I.	
Prerequisites:	
Conditions for course completion: Submission of the bachelor project, the defense of the project and acceptance of its content by the supervisor.	
Learning outcomes:	
Brief outline of the course:	
Recommended literature: 1. Scientific papers related to the topic of the bachelor project. 2. Directive No. 1/2011 of the rector UPJS in Košice.	
Course language:	
Notes:	
Course assessment Total number of assessed students: 13	
abs	n
100.0	0.0
Provides: doc. RNDr. Miroslav Almáši, PhD.	
Date of last modification: 08.09.2021	
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ BKP2/14	Course name: Bachelor Project
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: 5.	
Course level: I.	
Prerequisites:	
Conditions for course completion: Finalization and submission of the bachelor project based on the assignments of the supervisor and acceptance of its content by the supervisor.	
Learning outcomes: Finished bachelor project prepared as a design of a bachelor thesis, as an evidence that student is able to process knowledge available in different resources, cite correctly and keep the layout correctly, prepare a presentation and share the results in front of experts.	
Brief outline of the course: Using the created structure and partial work on the bachelor project, the student implements the second (finalization) phase of elaboration of the bachelor thesis based on the following activities: finalizes the project into a thesis in required formal and technical forms with correct citations of bibliographic references, implements the principles of presentation and reporting the work and its results.	
Recommended literature: 1. Resources (literature, papers) based on the project assignments. 2. Regulations No. 1/2011 about final works (thesis for University of P.J. Šafárik.	
Course language: Slovak, English	
Notes:	
Course assessment Total number of assessed students: 12	
abs	n
100.0	0.0
Provides:	
Date of last modification: 31.01.2022	
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: ÚFV/ BSSM/15		Course name: Bachelor State Exam Physics			
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present					
Number of ECTS credits: 1					
Recommended semester/trimester of the course:					
Course level: I.					
Prerequisites:					
Conditions for course completion: Answering questions concerning selected fields of the subjects of Bachelor state exam.					
Learning outcomes: Basic knowledge and overview of knowledge in the fields stated by the Bachelor state exam.					
Brief outline of the course: Exam in the field of knowledge in physics consisting of an overview of the following fields: <ul style="list-style-type: none"> - Mechanics and molecular physics - Electricity and magnetism - Oscillations and waves, optics - Nuclear physics - General biophysics - Theoretical mechanics - Theory of electromagnetic field - Statistical physics 					
Recommended literature:					
Course language: Slovak					
Notes:					
Course assessment Total number of assessed students: 29					
A	B	C	D	E	FX
41.38	31.03	17.24	0.0	6.9	3.45
Provides:					
Date of last modification: 16.02.2016					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: ÚFV/ 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.					
Prerequisites:					
Conditions for course completion: Required number of credits gained based on submitting the bachelor thesis.					
Learning outcomes:					
Brief outline of the course: Presentation of the bachelor thesis results, answering questions of the reviewer and members of professional commission.					
Recommended literature:					
Course language: Slovak or English					
Notes:					
Course assessment Total number of assessed students: 61					
A	B	C	D	E	FX
86.89	8.2	3.28	1.64	0.0	0.0
Provides:					
Date of last modification: 07.12.2021					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

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.					
Prerequisites:					
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: 255					
A	B	C	D	E	FX
88.63	8.24	1.57	1.57	0.0	0.0
Provides:					
Date of last modification: 07.12.2021					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					

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.	
Course level: I.	
Prerequisites: 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: 135					
A	B	C	D	E	FX
85.19	12.59	0.74	0.74	0.0	0.74
Provides: doc. RNDr. Ivan Potočník, PhD.					
Date of last modification: 21.07.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ BCHU/21	Course name: Biochemistry
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: 5.	
Course level: I.	
Prerequisites: ÚCHV/VCHU/10 or ÚCHV/VCHU/15 or ÚCHV/VACH/10 or ÚCHV/VCHU/14	
Conditions for course completion: Successful completion of the exam, which consists of two parts: (i) written and (ii) oral part. The student passes the exam if he / she obtains at least 60% of the points in the written part and at the same time adequately answers the asked questions in the oral part.	
Learning outcomes: Gain knowledge of: (i) the basic building blocks of biomacromolecules (proteins, DNA, RNA, fats and sugars) and their properties, (ii) the basic biochemical processes that take place in living organisms, (iii) the way energy is produced and used in cells.	
Brief outline of the course: <ol style="list-style-type: none"> 1. Protein Structure and Function, Exploring proteins. 2. DNA and RNA and the Flow of Genetic Information, Exploring genes. 3. Enzymes: Basic Concepts and Kinetics, Catalytic Strategies and Regulatory Strategies. 4. Carbohydrates (Monosaccharides, Disaccharides, Polysaccharides – Functions and Properties). 5. Lipids and Cells Membranes, Membrane Channels and Pumps. 6. Metabolism: Basic Concepts and Design, Signal-Transduction Pathways. 7. Glycolysis and Gluconeogenesis, Glycogen Metabolism. 8. The Citric Acid Cycle and Glyoxylate Cycle. 9. Oxidative Phosphorylation, The Light Reactions of Photosynthesis. 10. The Calvin Cycle and the Pentose Phosphate Pathway. 11. Fatty Acids Metabolism, Urea Cycle. 12. DNA Replication, Transcription (RNA Synthesis). 13. Protein Synthesis & Degradation, the Integration of Metabolism. 	
Recommended literature:	
Course language:	
Notes:	

Course assessment					
Total number of assessed students: 62					
A	B	C	D	E	FX
35.48	12.9	14.52	19.35	16.13	1.61
Provides: doc. RNDr. Erik Sedlák, DrSc., RNDr. Nataša Tomášková, PhD.					
Date of last modification: 14.11.2021					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ PBCHU/15	Course name: Biochemistry Practical
Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: 4 Per study period: 56 Course method: present	
Number of ECTS credits: 4	
Recommended semester/trimester of the course: 6.	
Course level: I.	
Prerequisites: ÚCHV/BCHU/03 or ÚCHV/BCHU/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: <ol style="list-style-type: none"> 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 trypsin. 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 K_m and V_{max} 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: 219					
A	B	C	D	E	FX
76.71	19.18	2.74	0.91	0.46	0.0
Provides: prof. RNDr. Mária Kožurková, CSc., RNDr. Nataša Tomášková, PhD., doc. RNDr. Rastislav Varhač, PhD., RNDr. Danica Sabolová, PhD., RNDr. Eva Konkoľová, PhD.					
Date of last modification: 19.11.2021					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

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.					
Prerequisites:					
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: Metallic and non-metallic elements and their roles in biological systems (biometals, bulk biological elements, essential trace elements). Biocoordination compounds, bioligands. Biocatalyzers. Oxygen carriers and oxygen transport proteins. Photochemical process. Catalysis and regulation processes. Calcium biominerals and biomineralization. Toxic metals. Application of knowledge of bioinorganic chemistry in pharmacy, chemotherapy (e.g. platinum complexes in cancer therapy) radiodiagnostics, mineral biotechnology, ecology and in other branches of life.					
Recommended literature: 1. Shriver D. F., Atkins P. W., Overton T. L., Rourke J.P., Weller M.T., Armstrong F.A.: Shriver & Atkins. Inorganic Chemistry. Oxford University Press, Oxford 2006. 2. Kaim W., Schwederski B.: Bioinorganic Chemistry: Inorganic Elements in the Chemistry of Life. Wiley, Chichester 1998. 3. Wilkins P. C., Wilkins R. G.: Inorganic Chemistry in Biology. OCP, Oxford 1997.					
Course language:					
Notes:					
Course assessment Total number of assessed students: 350					
A	B	C	D	E	FX
42.57	27.71	18.57	6.0	4.86	0.29
Provides: doc. RNDr. Zuzana Vargová, Ph.D.					

Date of last modification: 28.10.2021
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: ÚBEV/ BDD/05		Course name: Biology of Children and Adolescents			
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 2 / 0 Per study period: 28 / 0 Course method: present					
Number of ECTS credits: 2					
Recommended semester/trimester of the course: 4., 6.					
Course level: I.					
Prerequisites:					
Conditions for course completion: Written test					
Learning outcomes: Acquisition of basic morphological and physiological knowledge about individual organs and systems of the human body with a focus on the specifics of childhood and adolescence. Familiarity with developmental and growth characteristics and with the most common diseases in these stages of ontogenesis.					
Brief outline of the course: Human ontogenesis. Postnatal development. Age specific features of skeletal and muscular, circulatory, respiratory, gastrointestinal and urinary systems. Reproductive system. Endocrine system. Nervous system. Age specifics of selected diseases and drug dependence arise. Human population and environment.					
Recommended literature: Drobný I., Drobná M.: Biológia dieťaťa pre špeciálnych pedagógov I. a II. Bratislava, PdF UK, 2000 Lipková V.: Somatický a fyziologický vývoj dieťaťa. Osveta Bratislava, 1980 Malá H., Klementa J.: Biológia detí a dorastu. Bratislava, SPN, 1989					
Course language:					
Notes:					
Course assessment Total number of assessed students: 1717					
A	B	C	D	E	FX
31.74	23.76	17.94	16.83	9.2	0.52
Provides: doc. RNDr. Monika Kassayová, CSc.					
Date of last modification: 20.04.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					

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.	
Prerequisites:	
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 balances for preparation, dissolving and mixing of solutions, and for separating of mixtures. Material balances for combined processes. Chemical equations and material balances in the systems with chemical processes. Acid-Base equilibrium and the pH calculations. The solubility product and solubility.	
Recommended literature: Potočník 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: 1623					
A	B	C	D	E	FX
24.52	19.53	22.92	20.02	12.08	0.92
Provides: RNDr. Martin Vavra, PhD., doc. RNDr. Miroslav Almáši, PhD.					
Date of last modification: 15.11.2021					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

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.	
Prerequisites:	
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: 932					
A	B	C	D	E	FX
72.85	7.4	11.37	6.12	1.39	0.86
Provides: RNDr. Monika Tvrdoňová, PhD., doc. RNDr. Ladislav Janovec, PhD.					
Date of last modification: 11.08.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: ÚCHV/ SCHM/21		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: 2					
Recommended semester/trimester of the course:					
Course level: I.					
Prerequisites: (ÚCHV/OCHU/21 or ÚCHV/OCHU/03) and ÚCHV/ANCHU/21 and ÚCHV/ BCHU/21 and (ÚCHV/ACHU/21 or ÚCHV/ACHU/03) and (ÚCHV/FCHU/22 or ÚCHV/ FCHU/21 or ÚCHV/FCHU/10)					
Conditions for course completion:					
Learning outcomes:					
Brief outline of the course:					
Recommended literature:					
Course language:					
Notes:					
Course assessment Total number of assessed students: 52					
A	B	C	D	E	FX
9.62	26.92	21.15	19.23	15.38	7.69
Provides:					
Date of last modification: 08.09.2021					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: KOP/OPaPDV/14	Course name: Civil Law and Intellectual Property Rights
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: 4	
Recommended semester/trimester of the course: 3., 5.	
Course level: I., N	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 113	
abs	n
93.81	6.19
Provides: doc. JUDr. Renáta Bačárová, PhD., LL.M., prof. JUDr. Peter Vojčík, CSc.	
Date of last modification: 23.09.2021	
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.	

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: combined, present					
Number of ECTS credits: 2					
Recommended semester/trimester of the course:					
Course level: I., II., N					
Prerequisites:					
Conditions for course completion: Active participation in class and completed homework assignments. Students are allowed to miss two classes at the most. 2 credit tests (presumably in weeks 6/7 and 12/13) and an oral presentation in English. Final evaluation consists of the scores obtained for the 2 tests (50%) and the presentation (50%). Final grade will be calculated as follows: A 93-100 %, B 86-92%, C 79-85%, D 72-78%, E 65-71%, FX 64 % and less.					
Learning outcomes:					
Brief outline of the course:					
Recommended literature: www.bbclearningenglish.com Štěpánek, Libor a kol. Academic English-Akademická angličtina. Praha: Grada Publishing, a.s., 2011. McCarthy M., O'Dell F.: English Vocabulary in Use, Upper-Intermediate. CUP, 1994. Fictumova J., Ceccarelli J., Long T.: Angličtina, konverzace pro pokročilé. Barrister and Principal, 2008. Peters S., Gráf T.: Time to practise. Polyglot, 2007. Jones L.: Communicative Grammar Practice. CUP, 1985.					
Course language: English language, B2 level according to CEFR					
Notes:					
Course assessment Total number of assessed students: 289					
A	B	C	D	E	FX
44.64	20.76	17.65	7.96	6.23	2.77
Provides: Mgr. Barbara Mitříková, Mgr. Viktória Mária Slovenská					
Date of last modification: 12.02.2023					

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

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: combined, present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course:	
Course level: I., II., N	
Prerequisites:	
Conditions for course completion: Active classroom participation (maximum 2 absences tolerated), homework assignments completed by given deadlines. Powerpoint 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 effectively 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: 432					
A	B	C	D	E	FX
39.81	19.91	16.2	8.1	5.79	10.19
Provides: Mgr. Lenka Klimčáková					
Date of last modification: 13.09.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

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., II.	
Prerequisites:	
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: 56					
A	B	C	D	E	FX
60.71	10.71	8.93	3.57	8.93	7.14
Provides: Mgr. Ulrika Strömplová, PhD.					
Date of last modification: 12.07.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ POF1a/99	Course name: Computational Physics 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: 6.	
Course level: I.	
Prerequisites: ÚFV/NUM/10	
Conditions for course completion: To successfully complete the course, the student must demonstrate a sufficient degree of understanding of the principles of computer solution of some typical physical problems. The basis of continuous assessment is participation and activity in exercises and work on assignments. The course ends with a final oral exam, the completion of which is conditional on the submission of all four assignments (projects) electronically and with the attached computer program. The credit evaluation of the course takes into account the following student workload: direct teaching (2 credits) and individual work on projects (2 credits). The minimum threshold for completing the course is to obtain at least 50% of the total score, using the following rating scale: A (90-100%), B (80-89%), C (70-79%), D (60- 69%), E (50-59%), F (0-49%).	
Learning outcomes: To teach the basic principles of computer solution of some typical physical problems. The course covers both the area of deterministic methods for solving problems by ordinary and partial differential equations as well as the area of stochastic Monte Carlo simulations and thus forms the basis for further study of more advanced computer methods contained in the follow-up course Computational Physics II.	
Brief outline of the course: <ol style="list-style-type: none"> 1. Introduction to dynamical systems. 2. Numerical solution of systems of ordinary differential equations with initial condition. 3. Euler's method, convergence, error estimation and order of the method. One-step methods, Tylor-type and Runge-Kuta (RK2, RK4) methods. 4. Multistep methods, general linear method (explicit, implicit). Methods based on numerical quadrature. 5. Boundary value problems for ordinary differential equations. 6. Numerical solution of partial differential equations (PDE). Difference methods, their consistence, convergence and stability. Elliptic PDE. 7. Parabolic PDE, diffusion equation. Explicit and implicit methods. 8. Introduction to the Monte Carlo method. Monte Carlo integration and application in statistical physics. 	

9. Basics of probability theory. Monte Carlo estimate of mean and standard deviation. Central theorem of Monte Carlo sampling.
10. Simple and importance sampling. Markov chain. Perron-Frobenius theorem. Metropolis algorithm, detailed balance condition.
11. Monte Carlo simulations of lattice spin systems - application to Ising model.
12. Statistical analysis of Monte Carlo data.

Recommended literature:

Basic literature:

POZRIKIDIS, C.: Num. Comp. in Science and Engineering, Oxford Univ. Press, 2008.

GARCIA A.L.: Numerical Methods for Physics, Prentice-Hall, 1994.

LANDAU D.P., BINDER K.: A Guide to Monte Carlo Simulations in Statistical Physics, Cambridge Univ. Press, 5-th edition, 2021.

Other literature:

BERG, B.A.: Introduction to Markov Chain Monte Carlo Simulations and Their Statistical Analysis (http://www.worldscibooks.com/etextbook/5904/5904_intro.pdf)

JANKE, W.: Monte Carlo Simulations of Spin Systems (<http://www.physik.uni-leipzig.de/~janke/Paper/spinmc.pdf>)

Course language:

Notes:

Course assessment

Total number of assessed students: 130

A	B	C	D	E	FX	N	P
30.0	18.46	12.31	15.38	16.92	2.31	0.0	4.62

Provides: prof. RNDr. Milan Žukovič, PhD.

Date of last modification: 14.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ PPFM/15	Course name: Computer-Based Physical Measurement
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.	
Prerequisites:	
Conditions for course completion: Terms and conditions of assessment during the semester -participation in laboratory exercises in accordance with study regulations and teacher's instructions -active participation at laboratory exercises -submitting all the laboratory reports in accordance with teacher's instruction Final assessment: -based on assessment during the semester Conditions for successful completion of the course: -participation in lessons in accordance with the study regulations and teacher's instructions -achieving the level higher than 50 % in assessment during the semester and in final assessment	
Learning outcomes: By the end of the course student is able to measure physical quantities, process and analyze data with the help of computer. He is able to interpret results, draw conclusions and elaborate formal report about the gained results. He is able to explain the physical principles of conducted laboratory exercises to demonstrate his conceptual understanding.	
Brief outline of the course: The content of the course involves labworks in physics aimed at selected problems of General Physics I,II,III. <ol style="list-style-type: none"> 1. Motion in the Earth's homogenous gravitational field 2. Bungee jumper 3. Ideal gas behaviour 4. Molar mass of gas 5. Thermal expansion of water 6. Electrical resistance and temperature 7. Ohm's law for closed electric circuit 8. Bulbs' behaviour in dc electric circuit 9. Planck constant 10. Transient phenomena in RC and RL circuit 11. Alternating current electric circuit 12. Forced oscillations and resonance 	

Recommended literature: CUMMINGS, Karen, LAWS, Priscilla, REDISH, Edward, COONEY, Patrick: Understanding Physics, John Wiley & Sons, 2004					
Course language: English					
Notes:					
Course assessment Total number of assessed students: 44					
A	B	C	D	E	FX
72.73	9.09	18.18	0.0	0.0	0.0
Provides: doc. RNDr. Zuzana Ješková, PhD.					
Date of last modification: 15.09.2021					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: ÚCHV/ KCHU/03		Course name: Coordination 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: 4					
Recommended semester/trimester of the course: 5.					
Course level: I.					
Prerequisites: ÚCHV/ACHU/03					
Conditions for course completion: Final written exam					
Learning outcomes: The student acquires basic knowledge on the coordination compounds, preparation, isomerism and properties of coordination compounds as well as about the chemical bonding in coordination compounds.					
Brief outline of the course: 1. Definition and nomenclature of coordination compounds. 2. Central atom and ligands 3. Coordination numbers, coordination polyhedra. 4. Isomerism of coordination compounds 5. Preparation of coordination compounds 6. Stability of coordination compounds 7. Chemical bonding in coordination compounds.					
Recommended literature: J. Ribas: Coordination Chemistry, Wiley-VCH, Weinheim, 2008. J. C. Huheey, E. A. Keiter, R. L. Keiter: Inorganic Chemistry, Haper Collins, New York, 1993. G. A. Lawrance: Introduction to Coordination Chemistry, Wiley, 2010.					
Course language:					
Notes:					
Course assessment Total number of assessed students: 76					
A	B	C	D	E	FX
51.32	26.32	14.47	3.95	3.95	0.0
Provides: prof. RNDr. Juraj Černák, DrSc., doc. RNDr. Juraj Kuchár, PhD.					
Date of last modification: 10.09.2021					

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

COURSE INFORMATION LETTER

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

Course assessment					
Total number of assessed students: 562					
A	B	C	D	E	FX
76.87	16.9	4.09	1.6	0.18	0.36
Provides: prof. PhDr. Ol'ga Orosová, CSc., Mgr. Lucia Barbierik, PhD., Mgr. Lenka Abrinková, PhD., Mgr. Frederika Lučanská, PhD., Mgr. Viera Čurová, Mgr. Marcela Majdanová, PhD.					
Date of last modification: 24.06.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/EDS/15	Course name: Educational software
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: 5.	
Course level: I.	
Prerequisites:	
Conditions for course completion: Conditions for ongoing evaluation: <ol style="list-style-type: none"> 1. Creation of a worksheet for student (with custom graphics). 2. Creation of a multimedia educational presentation (with pictures, animations and sounds). 3. Creation of an interactive educational quiz (with various types of quiz items). 4. Creation of an instructional educational video. Conditions for the final evaluation: <ol style="list-style-type: none"> 1. Creation and presentation of final project on the use of educational software in education. Conditions for successful completion of the course: Obtaining at least 50% of points for ongoing and final assignments.	
Learning outcomes: Students will receive, resp. deepen their basic skills in working with: <ol style="list-style-type: none"> a) presentation software, programs for creating and editing images, animations, diagrams, sounds, conceptual maps, b) programs for the creation of didactic tests, questionnaires, surveys, c) simulation and modeling software, d) selected subject-oriented educational programs, Students present and discuss their idea of the use of educational software and educational Internet resources and tools in the selected school subject.	
Brief outline of the course: <ol style="list-style-type: none"> 1. Overview of educational software and educational web resources and tools. 2. Creating and processing images into teaching aids (word clouds, QR codes, diagrams, concept maps). 3. Creating raster animations. Creating and processing sounds. 4. Creation of instructional educational video. 5. Electronic voting (Polleverywhere, Plickers, Kahoot!) and questionnaire creation (Google Forms). 6. Creation of didactic tests (Google Forms, HotPotatoes). 7. Collaborative web applications (mind42, miro, whiteboard, padlet). 8. Online communication tools (BBB). 	

9. Complex online learning environments (Moodle).
10. Online educational projects and competitions (eTweening, WebQuest, PALMA junior).
11. Simulations and modelling (WolframAlpha, PhET, Geogebra). Subject-focused educational programmes.
12. Creation of educational software in Scratch environment.

Recommended literature:

SOLOMON, Gwen and Lynne SCHRUM, 2014. Web 2.0 How-to for Educators. Second. International Society for Technology in Education, 314 p. ISBN 978-1564843517.

STOBAUGH, Rebecca, 2019. Fifty Strategies to Boost Cognitive Engagement: Creating a Thinking Culture in the Classroom (50 Teaching Strategies to Support Cognitive Development). Solution Tree Press, 176 p. ISBN 978-1947604773.

LEMOV, Doug, 2015. Teach Like a Champion 2.0: 62 Techniques That Put Students on the Path to College [online]. 2nd edition. John Wiley & Sons, Incorporated, 509 p. [cited 2021-7-10]. ISBN 9781118898628. Available from: <https://ebookcentral.proquest.com/lib/upjs-ebooks/detail.action?docID=1895720>

European Schoolnet: Transforming education in Europe [online]. [cited 2021-7-10]. Available from: <http://www.eun.org/home>

Science On Stage Europe [online]. Science on Stage Europe e.V. [cited 2021-7-10]. Available from: <https://www.science-on-stage.eu/>

Course language:

Slovak and partly English due to selected programs and information sources

Notes:

By default, teaching is carried out face to face. If this is not possible (eg due to a pandemic), teaching is provided at a distance through video conferencing programs and LMS.

Course assessment

Total number of assessed students: 77

A	B	C	D	E	FX
68.83	15.58	9.09	0.0	6.49	0.0

Provides: doc. RNDr. Ľubomír Šnajder, PhD.

Date of last modification: 01.08.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ ELP1/01	Course name: Electronics 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: 6.	
Course level: I.	
Prerequisites: ÚFV/ELE1/07 or ÚFV/ELEM1/15	
Conditions for course completion: For successful exam of the subject, the student must demonstrate sufficient understanding of selected problems from electronics. Knowledge of student will be tested by talk during practices. It is necessary to properly process the theoretical preparation of the topic for the preparation of the experiment. Subsequently analyze and interpret experimental results. Condition for obtaining credits is to perform all tasks and passing protocols from measurements. Credit assessment of the subject takes into account the following student burden: performing experimental measurements (1 credit), self-study and theoretical preparation (1 credits) and drafting protocols (1 credits). The minimum boundary for completing the subject is to obtain at least 50% of the total point evaluation, using the following evaluation scale: A (90-100%), B (80-89%), C (70-79%), D (60- 69%), E (50-59%), F (0-49%).	
Learning outcomes: Practical work of students in the design, construction and properties of the measurements of electronic circuits and interpretation of the results obtained to verify and consolidate the theoretical knowledge acquired in lectures on the subject Electronics.	
Brief outline of the course: <ol style="list-style-type: none"> 1. Combinatorial logical circuits. 2. Logical memory circuits. 3. Logical sequence circuits. 4. Rectifiers, filters, stabilizers. 5. Generators of harmonic signals. 6. Operational amplifiers and operational network interfaces. 7. Digital-to-analog converters. 8. Analog-to-digital converters. 9. Reserve. 	
Recommended literature: <ol style="list-style-type: none"> 1. Delaney C.F.G.: Electronics for the Physicist with Applications. John Willey & Sons, New York, 1980. 2. Zbar P.B., Malvino A.P., Miller M.A.: Basic Electronics: a Text-Lab Manual. Macmillan/McGraw – Hill, New York, 1994. 	

Course language: 1. Slovak 2. English					
Notes:					
Course assessment Total number of assessed students: 42					
A	B	C	D	E	FX
92.86	0.0	2.38	4.76	0.0	0.0
Provides: RNDr. Vladimír Tkáč, PhD.					
Date of last modification: 20.09.2021					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ ELEM1/15	Course name: Electronics
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: 3	
Recommended semester/trimester of the course: 5.	
Course level: I.	
Prerequisites: ÚFV/VF1b/03 or ÚFV/VFM1b/15	
Conditions for course completion: Exam	
Learning outcomes: To explain physical principles of classical electronic components and systems and technologies of their realization. To perform analysis of properties and functions of basic electronic elements, electronic circuits and information transmission and processing systems. To introduce student into basic elements and devices in area of nanoelectronics and to explain methods of their fabrication and principles of their functioning.	
Brief outline of the course: <ol style="list-style-type: none"> 1. Introduction to electronics: Basic components of electronic circuits, basic electrical laws 2. Passive components, basic properties of semiconductors 3. Semiconductors without PN junction, components with PN junction 4. Semiconductors with PN junction 5. Transistor phenomenon, transistor 6. Electronic circuit with transistor 7. Operational amplifiers 8. Sources and generators 9. Two-value logic algebra, combinational logic circuits 10. Digital memory circuits 11. Sequential logic circuits 12. Digital-analog converters, analog-digital converters 	
Recommended literature: <ol style="list-style-type: none"> 1. Brown P.B., Frantz G.N., Moraff H.: Electronics for the Modern Scientist. Elsevier, 1982. 2. Delaney C.F.G.: Electronics for the Physicist with Applications. John Willey & Sons, 1980. 3. Wolt E. L.: Quantum Nanoelectronics, An introduction to electronic nanotechnology and quantum computing, Wiley-VCh, 2009 	
Course language: Slovak	
Notes:	

Course assessment					
Total number of assessed students: 169					
A	B	C	D	E	FX
23.67	24.85	28.4	11.24	5.33	6.51
Provides: RNDr. Vladimír Tkáč, PhD.					
Date of last modification: 02.09.2021					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

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: 4.	
Course level: I.	
Prerequisites:	
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-intermediate, Intermediate. Cambridge University Press, 2003. Armer, T.: Cambridge English for Scientists. CUP, 2011. Wharton J.: Academic Encounters. The Natural World. CUP, 2009. P. Fitzgerald : English for ICT studies. Garnet Publishing, 2011. 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: 3056					
A	B	C	D	E	FX
38.29	26.18	16.46	9.55	7.46	2.06
Provides: Mgr. Lenka Klimčáková, Mgr. Viktória Mária Slovenská					
Date of last modification: 05.02.2023					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: ÚCHV/ PCH1/00		Course name: Food 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: 4					
Recommended semester/trimester of the course: 5.					
Course level: I., II.					
Prerequisites:					
Conditions for course completion: Active work during semester, presentation on certain theme. Two exams, one in the middle and second at the end of semester (min. 51%). A: 91-100b, B: 81-90b, C: 71-80b, D: 61-70b, E: 51-60b, FX: 0-50b.					
Learning outcomes: Students will receive informations and knowledges about chemical substances in food, their importance and chemical changes in food during processing and storage.					
Brief outline of the course: The main categories of substances in the most important group of food. Aminoacids, proteins, lipids, carbohydrates. Water, minerals, low concentration anorganic compounds, vitamins. Hydrocarbons, colorants, toxic compounds, aditives. Chemical reactions in dairy products.					
Recommended literature:					
Course language: english					
Notes: Teaching is carried out in person or, if necessary, online using the MS Teams or BBB (BigBlueButton) tool. The form of teaching is specified by the teacher at the beginning of the semester, updated continuously.					
Course assessment Total number of assessed students: 296					
A	B	C	D	E	FX
65.88	29.39	4.39	0.0	0.0	0.34
Provides: RNDr. Ján Elečko, PhD.					
Date of last modification: 28.01.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

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: 3.	
Course level: I.	
Prerequisites:	
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 příkladech a cvičeních, Karolinum, 2010 3. Mikkelsen, S.R, Cortón E.: Bioanalytical Chemistry, Wiley, 2004 4. Wilson I.: Bioanalytical Separations 4, (Handbook of Analytical Separations), Elsevier, 2003 5. Lee, D.C., Webb, M.: Pharmaceutical Analysis, Blackwell, 2003	
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: 98					
A	B	C	D	E	FX
33.67	31.63	29.59	4.08	0.0	1.02
Provides: doc. RNDr. Katarína Reiffová, PhD.					
Date of last modification: 22.07.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ VBFM1/15	Course name: General Biophysics 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: 3	
Recommended semester/trimester of the course: 3.	
Course level: I.	
Prerequisites:	
Conditions for course completion: Exam. During an exam, a student should be able to demonstrate his/her knowledge from the parts of Biophysics which are described in the brief outline of the course.	
Learning outcomes: To provide information about the object, significance and role of biophysics in science. The main emphasis will be given on the understanding of the principles determining the structure and function of the most important biological structures (nucleic acids, proteins, biomembranes) as well as on the thermodynamics and kinetics of selected chemical and biophysical processes.	
Brief outline of the course: Week 1 Areas of interest of biophysics and its importance and position in science. Structure of biophysics. Characterization of molecular, cellular, medical, environmental and radiation biophysics. Scientific disciplines related to biophysics. The future of biophysics. Week 2 Intra-molecular and intermolecular interactions. Covalent bonds. Coulomb (ionic) interactions. Van der Waals forces. Lennard - Jones potential. Hydrogen bonds. The role of hydrogen bonds in biological macromolecules. Hydrophobic interactions. Hydrating forces. Empirical analytical form for the potential energy of intramolecular interactions. Stabilizing non-covalent interactions in biopolymers (proteins, nucleic acids, biological membranes). Week 3 Thermodynamics in biological systems. Definition of thermodynamics. Thermodynamic system. 1st law of thermodynamics (law of conservation of energy). Internal energy and enthalpy. Heat capacity. Examples of the use of the study of enthalpy change in biological processes. 2nd law of thermodynamics (law of process spontaneity). Entropy. 3rd law of thermodynamics. Gibbs energy. Dependence of Gibbs energy on temperature - Gibbs - Helmholtz equation. Dependence of Gibbs energy on pressure. Chemical potential. Chemical potential in liquids. Equilibrium constant of chemical reaction. Influence of temperature on the equilibrium constant - van't Hoff's equation. Calorimetric and van't Hoff enthalpy of protein and nucleic acid denaturation. Week 4	

Molecular associations. Examples of molecular associations in biological systems. Dissociation and association equilibrium constants. Determination of equilibrium constants of ligand - macromolecule interactions. Langmuir isotherm. Graphical analysis of equilibrium binding data. Multiple independent binding sites. Ligand-macromolecule binding cooperativity. Cooperativity - simultaneous ligand binding, Hill's equation. Cooperativity - gradual binding of ligands. Allosteric interactions.

Week 5

Kinetics of biological and physico-chemical processes. Importance of the study of the kinetics of chemical processes. Rates of chemical reactions. Rate constants and rate law of chemical reactions. Order of chemical reaction. First order chemical reactions. Second order chemical reactions. Consecutive reactions - the rate determining step of the reactions. Reverse chemical reactions. Relaxation processes. Temperature dependence of rate constants - Arrhenius equation. Experimental techniques for determining the rate of chemical reactions.

Week 6

Physical kinetics. Macroscopic diffusion. 1st Fick's law. 2nd Fick's law - diffusion equation. Solutions of the diffusion equation for specific cases. Influence of external forces on diffusion processes. Einstein - Smoluchowski equation. Stokes' law. Kinetics of photophysical and photochemical processes. Jablonski diagram. Quantum yields of photophysical processes. Quenching of the excited state of molecules by external factors. Fluorescence quenching. Stern - Volmer equation. Förster resonant energy transfer.

Week 7

Proteins. Functions and significance of proteins. Chemical structure and properties of amino acids. Peptide bond. Polypeptide chain. Protein structures. Relationship between individual structures. Ramachandra map. Protein solubility. Stability of protein structure. Protein denaturation. Thermal denaturation. Calorimetric and van't Hoff enthalpy of denaturation. Chemical denaturation. Molten - globular state of proteins. Protein folding. Levinthal paradox. Physiological consequences of incorrectly folded and aggregated proteins.

Week 8

Nucleic acids. Nucleic acid building blocks (nitrogenous bases, ribose, deoxyribose, phosphoric acid). Chemical structures of nucleotides. Primary and secondary structure of nucleic acids. Polynucleotide strand. Complementarity of bases in DNA. DNA conformations. Circular DNA. RNA structures. Functions of individual RNAs. Forces determining the structure and conformation of nucleic acids. DNA denaturation and renaturation.

Week 9

Biological membranes. Chemical composition of biological membranes. Lipids, cholesterol. Lipid representation in membranes. Membrane proteins. Micelles and liposomes. Structure of biological membranes. Liquid mosaic model. Phase transition in the membrane. Interactions between the lipid and protein part of the biological membrane. Transport of molecules across membranes. Membrane channels. Membrane transporters. Energetics of membrane transport. Nernst potential. Donnan's equilibrium.

Week 10

Biophysical bases of imaging examination methods. Basic principles of bio-imaging. Ultrasound diagnostic methods. Optical imaging methods. Luminescence microscopy. X-ray diagnostic technique. Computed tomography (CT). Principles of magnetic resonance. Magnetic resonance imaging.

Week 11

Biophysical bases of some treatment methods. Photodynamic therapy. Molecular mechanisms of photodynamic action. Biological response to photodynamic action. Photosensitizers. Singlet oxygen. Light sources in photodynamic therapy. Drug transport systems.

Week 12

Radiation and environmental biophysics. Radiobiology. Radiation protection. Effects of physicochemical stimuli on biological organisms (pressure, temperature, humidity). Influence of electromagnetic field on biological systems. Interaction of ionizing and non - ionizing radiation with biological systems.

Recommended literature:

1. R. Glaser. Biophysics (2nd Edition), Springer-Verlach Berlin, 2012.
2. M.B. Jackson. Molecular and Cellular Biophysics, Cambridge University Press, 2006.
3. M. Daune. Molecular biophysics (Structures in motion), Oxford University Press, 2004.
4. J. P. Allen. Biophysical Chemistry, Wiley-Blackwell, 2008.
5. J.A. Tuszynski. Molecular and Cellular Biophysics, Chapman & Hall/CRC, 2008.
6. D.J. Dowsett, P.A. Kenny and R.E. Johnston. The Physics of Diagnostic Imaging, Hodder Arnold, 2006.
7. P. Nelson. Biological Physics. W.H. Freeman and Company, 2008.
8. G. S. Campbell and J. M. Norman. Introduction to Environmental Biophysics (2nd Edition). Springer Science, 1998.
9. R. Splinter (Ed.). Handbook of Physics in Medicine and Biology. CRC Press, Taylor & Francis Group, 2010.
10. R.K. Hoobbe and B.J. Roth. Intermediate Physics for Medicine and Biology (4th Edition), Springer Science, 2007.

Course language:

English language

Notes:**Course assessment**

Total number of assessed students: 12

A	B	C	D	E	FX
16.67	58.33	25.0	0.0	0.0	0.0

Provides: doc. Mgr. Daniel Jancura, PhD.

Date of last modification: 17.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: ÚCHV/ VCHU/15		Course name: General Chemistry			
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 4 / 2 Per study period: 56 / 28 Course method: present					
Number of ECTS credits: 7					
Recommended semester/trimester of the course: 1.					
Course level: I.					
Prerequisites: ÚCHV/CHV1/99					
Conditions for course completion: Written test in the middle and the end of the semester followed by the oral examination. Active participation on seminars.					
Learning outcomes: To provide students with knowledge of atoms and molecules their electronic structure, theories of chemical bonds, physical and chemical properties of elements and compounds as well as their periodicity.					
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. State of matter. Solutions. Chemical equilibrium. Basis of chemical thermodynamics and chemical kinetics. Classification of chemical reactions. Electrochemistry.					
Recommended literature: 1. Atkins P., Jones L.: Chemical Principles, 2nd ed., Freeman, New York 2002. 2. Russel J.B.: General Chemistry, 2nd ed., McGraw Hill, London 1992.					
Course language:					
Notes:					
Course assessment Total number of assessed students: 310					
A	B	C	D	E	FX
23.87	29.03	28.39	11.61	7.1	0.0
Provides: prof. RNDr. Vladimír Zelenák, DrSc.					
Date of last modification: 07.02.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ PACU/03	Course name: General Course of Analytical Chemistry - Laboratory
Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: 4 Per study period: 56 Course method: present	
Number of ECTS credits: 4	
Recommended semester/trimester of the course: 4.	
Course level: I.	
Prerequisites: ÚCHV/ANCHU/03 or ÚCHV/ANCHU/21	
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 qualitative and quantitative analytical chemistry into analytical laboratory practise.	
Brief outline of the course: Practical in qualitative and quantitative analysis. Qualitative analysis, separation by selective precipitation. Quantitative methods. Gravimetry, general principles of method. Volumetric methods. Preparation of accurate solutions. Indication of equivalency point. Titration curves, calculations in volumetric analysis. Acidimetry, alkalimetry. Manganometry. Iodometry. Complexometry. Selected Instrumental analytical methods.	
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: 402					
A	B	C	D	E	FX
58.21	28.36	10.95	1.24	1.24	0.0
Provides: RNDr. Rastislav Serbin, PhD., RNDr. Jana Šandrejová, PhD.					
Date of last modification: 15.11.2021					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ VFM1a/15	Course name: General Physics I
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 4 / 2 Per study period: 56 / 28 Course method: present	
Number of ECTS credits: 6	
Recommended semester/trimester of the course: 1.	
Course level: I.	
Prerequisites:	
Conditions for course completion: Terms and conditions of assessment during the semester -participation in classes in accordance with study regulations and teacher's instructions -active participation at seminars and exercises -submitting all the assignments in accordance with teacher's instruction -tests during the semester -project group work and its successful presentation and defence Final assessment: -final oral examination Conditions for successful completion of the course: -participation in lessons in accordance with the study regulations and teacher's instructions -achieving the level higher than 50 % in assessment during the semester and in final assessment	
Learning outcomes: By the end of the course student masters basic knowledge connected with mechanics, molecular physics and thermodynamics. Student will be able to solve various problems connected with the course content and apply gained knowledge in different situations.	
Brief outline of the course: Basic knowledge of the calculus, vector algebra. Standards and units. Kinematics. Dynamics. The principle of relativity in the classical mechanics. Gravitation. Mechanics of many-particle systems. The motion of rigid bodies. Deformation, elasticity. Mechanics of fluids and gases. Laws of ideal gases. Kinetic theory. The thermodynamic laws. Statistical character of the second law. Entropy. Molecular phenomena in liquids and solids. Phase transitions.	
Recommended literature: CUMMINGS, Karen, LAWS, Priscilla, REDISH, Edward, COONEY, Patrick: Understanding Physics, John Wiley & Sons, 2004	
Course language: English	
Notes:	

Course assessment					
Total number of assessed students: 212					
A	B	C	D	E	FX
27.83	16.51	19.81	13.68	18.87	3.3
Provides: doc. RNDr. Zuzana Ješková, PhD.					
Date of last modification: 15.09.2021					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: ÚFV/VFM1b/15		Course name: General Physics II			
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 4 / 2 Per study period: 56 / 28 Course method: present					
Number of ECTS credits: 6					
Recommended semester/trimester of the course: 2.					
Course level: I.					
Prerequisites: ÚFV/VF1a/12 or ÚFV/VFM1a/15					
Conditions for course completion: Two written distance tests. Distance oral exam.					
Learning outcomes: To obtain a general view on basic electric magnetic phenomena and ability to solve basic problems of this subject.					
Brief outline of the course: Electric field in the free space. Work of the forces in the electrostatic field. Electrostatic field and steady current. Current in electrolytes, semiconductors, gasses and vacuum. Thermoelectric effects. Magnetic field in the free space. The interaction of moving charges with the electric current. Quasi steady electric field. Electromagnetic induction. Energy of magnetic field. AC current and circuits with ac current. Multiphase AC current. Rotating magnetic field. Electric effects in the substances. Magnetic properties of the substances. Magnetic polarization. Diamagnetism and paramagnetism, Magnetic ordering. Ferromagnetism.					
Recommended literature: I. S. Grant, W.R. Phillips, Electromagnetism, John Wiley&Sons, Ltd, England, 1990					
Course language: english					
Notes:					
Course assessment Total number of assessed students: 45					
A	B	C	D	E	FX
44.44	17.78	17.78	4.44	2.22	13.33
Provides: prof. RNDr. Peter Kollár, DrSc., doc. RNDr. Adriana Zeleňáková, PhD., doc. RNDr. Erik Čižmár, PhD.					
Date of last modification: 29.03.2020					

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: ÚFV/VFM1c/15		Course name: General Physics III			
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 4 / 2 Per study period: 56 / 28 Course method: present					
Number of ECTS credits: 6					
Recommended semester/trimester of the course: 3.					
Course level: I.					
Prerequisites: ÚFV/VF1b/03 or ÚFV/VFM1b/15					
Conditions for course completion: Written test (2x) from seminars during the semester. Oral examination.					
Learning outcomes: The objective is to acquaint the students with the basis of oscillations, waves and optics.					
Brief outline of the course: Undamped oscillations, Mathematical, Physical and Torsional pendulum, Damped oscillations, Fourier transformation, Forced oscillations. Waves, their generation, waves equation. Interference. Huyghens principle. Reflection, diffraction. Doppler effect. Waves speed in materials. Acoustics. Geometrical optics. Mirrors, lens. Fotometry. Light as electromagnetic wave. Dispersion, absorption, interference, diffraction, polarization. Photon's theory of light. Law of emission and absorption, Planck's law of radiation. Lasers.					
Recommended literature: 1. A. Hlavička et al., Fyzika pro pedagogické fakulty, SPN, 1971 2. R.P. Feynman et al., Feynmanove prednášky z Fyziky I,II,III, ALFA, 1985 3. D. Halliday et al., Fyzika-Vysokoškolská učebnice obecné fyziky, VUTIUM, 2010 4. J. Fuka, B. Havelka, Optika a atómová fyzika, SPN, 1961 5. A. Štrba, Všeobecná Fyzika 3 – Optika, ALFA, 1979					
Course language: slovak					
Notes:					
Course assessment Total number of assessed students: 75					
A	B	C	D	E	FX
36.0	18.67	28.0	10.67	6.67	0.0
Provides: doc. RNDr. Ján Füzér, PhD.					
Date of last modification: 28.09.2021					

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/VFM1d/15	Course name: General Physics IV
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 4 / 2 Per study period: 56 / 28 Course method: present	
Number of ECTS credits: 6	
Recommended semester/trimester of the course: 4.	
Course level: I.	
Prerequisites: ÚFV/VF1c/10 or ÚFV/VF1c/12 or ÚFV/VFM1c/15	
Conditions for course completion: - active participation in lectures and excersises - submission of solved tasks - 2x test - an exam Credit evaluation of the subject: direct teaching and consultations (2credits), self-study (1credit), practical activities- solved tasks (1 credit), evaluation (2 credits), a total of 6 credits. Minimum limit for completion of the course is to obtain at least 51% of the total evaluation.	
Learning outcomes: Basic knowledge about the atomic structure and spectra and nuclei, and elementary particles. Basic experimental methods in nuclear physics and passage of nuclear radiation through media.	
Brief outline of the course: 1.-6. week Atomic Physics - A.Kravčáková (P): Corpuscular-wave dualism: De Broglie waves. Experimental confirmation of de Broglie's hypothesis. Uncertainty principle. Atom structure: Atomic hypothesis. Rutherford's experiment. Bohr model of the atom. Hydrogen radiation spectra. Combination principle. Quantum mechanical description of a hydrogen atom. Electron shell: Spectra of hydrogen type atoms. Experimental verification of the existence of discrete levels of atoms (Franck-Hertz experiment). Angulat momentum of electron motion. Stern-Gerlach experiment. Quantum states of electrons. Atoms with more electrons. Alkali metal spectra. Total angular momentum of an atom. Magnetic momentum of an atom. An atom in an external magnetic and electric field. Zeeman's phenomenon. Selection rules. Pauli's principle. Periodic table of elements. X-ray spectra. Molecules: Ion and covalent coupling, spectra of molecules. 7.-12. week Nuclear Physics - J.Vrláková (P): Basic characteristics of atomic nuclei: Mass and electric charge. Radius of the atomic nucleus. Binding energy. Spin and magnetic momentum of the nucleus. Quadrupole momentum. Parity. Nuclear forces and models of atomic nuclei: Properties of nuclear forces. Meson theory of nuclear forces. Models of atomic nuclei (droplet, layer and generalized model).	

Radioactive radiation: Basic laws of radioactive decay. Law of decay. Alpha decay. Beta decay. Processes taking place in the nucleus during beta conversion. Neutrino existence hypothesis. Fermi's theory. Internal conversion. Gamma radiation.

Nuclear reactions: Basic terms and definitions. Classification of nuclear reactions. Conservation laws. Effective cross section. Mechanisms of nuclear reactions. Basic types of reactions. Breit-Wigner formula. Reactions with neutrons. Fission of atomic nuclei. Mechanism of fission. Nuclear reactor. Thermonuclear reactions.

Week 13 Subnuclear physics - A.Kravčáková (P):

Elementary particles: The concept of an elementary particle. Basic characteristics of particles. Conservation laws. Types of interactions. Antiparticles. Classification of elementary particles. Strange particles. Resonances. Quark model of hadrons.

Cosmic radiation: Primary and secondary components. Elementary particles and cosmology.

Week 14 Experimental methods - A.Kravčáková (P):

Passage of radiation through matter: The passage of heavy charged particles, electrons and gamma radiation through the matter.

Detectors: Basic characteristics of detectors. Volt-ampere characteristic. Gas detectors. Ionization chambers and Geiger-Müller computer. Scintillation, Cherenkov and semiconductor detectors. Track detectors.

Particle accelerators: Linear accelerator. Cyclic accelerators. Colliders.

Recommended literature:

1. Beiser A., Úvod do moderní fyziky, Praha, 1975.
2. Úlehla I., Suk M., Trka Z.: Atómy, jadra, částice, Praha, 1990.
3. Síleš E., Martinská G.: Všeobecná fyzika IV, skriptá PF UPJŠ, 2. vydanie, Košice, 1992.
4. Vrláková J., Kravčáková A., Vokál S.: Zbierka príkladov z atómovej a jadrovej fyziky, skriptá PF UPJŠ, Košice, 2016.
5. Hajko V. and team of authors, Physics in experiments, Bratislava, 1997.
6. Nosek D., Jadra a částice (Řešené příklady), Matfyzpress, MFF UK, Praha 2005,
7. Kravčáková A., Vokál S., Vrláková J., Všeobecná fyzika IV, 1.časť Atómová fyzika, skriptá PF UPJŠ, Košice, 2020.
8. Yang F., Hamilton J.H., Modern Atomic and Nuclear Physics, WSC Singapore, 2010.

Course language:

slovak and english

Notes:

Course assessment

Total number of assessed students: 34

A	B	C	D	E	FX
58.82	11.76	20.59	5.88	2.94	0.0

Provides: doc. RNDr. Adela Kravčáková, PhD., doc. RNDr. Janka Vrláková, PhD., RNDr. Zuzana Paulínyová, PhD.

Date of last modification: 16.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: KF/DF2p/03	Course name: History of Philosophy 2 (General Introduction)
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.	
Prerequisites:	
Conditions for course completion: The condition for awarding the evaluation will be the active approach of students to fulfilling their study obligations, independent work with selected philosophical texts in the library, active participation and creative work in seminars. In connection with the possibility of interrupting face-to-face teaching, there will be greater demands on the student's independent study and the processing of professional literature, which will be continuously evaluated, using e-mail to communicate with the teacher, at the end of the semester, preparing and handing in the semester's seminar work by the set date, or also passing a knowledge test - about which the students will be informed in advance in sufficient time.	
Learning outcomes: Deepening knowledge about the development of spiritual culture in the European spiritual space and pointing out the most important sources of this development: (1) ancient philosophy and science, (2) Christianity as the second pillar of Europe, (3) the Renaissance and the emergence of modern science (mathematical natural science) as the third pillar of European development. Development of critical thinking skills, active position in professional (ethics of science), public and private life (ethics of responsibility). Transcending narrowly specialized views of the world.	
Brief outline of the course:	
Recommended literature: Antológia z diel filozofov. Predsokratovci a Platon. Zost. J. Martinka. Bratislava: Nakladateľstvo Epocha 1970; Antológia z diel filozofov. Od Aristotela po Plotina. Zost. J. Martinka. Bratislava: Nakladateľstvo Pravda 1972. Predsokratovci a Platon. Antológia z diel filozofov. Zost. J. Martinka. Bratislava: Vydavateľstvo Iris 1998. Od Aristotela po Plotina. Antológia z diel filozofov. Zost. J. Martinka. Bratislava: Vydavateľstvo IRIS 2006. Anzenbacher, A.: Úvod do filozofie. Prel. K. Šprunk. Praha: SPN 1990. Barthes, R.: Mytologie. Prel. J. Fulka. Praha: Dokořán 2004. Bělohradský, V.: Společnost nevolnosti. Eseje z pozdější doby. Praha: SLON 2009. Benjamin, W.: Iluminácie. Prel. A. Bžoch; J. Truhlářová. Bratislava: Kalligram 1999. Borges, J. L.: Borges ústne. Prednášky a eseje. Prel. P. Šišmišová. Bratislava: Kalligram 2005. Cassirer, E.: Esej o človeku. Prel. J. Piaček. Bratislava: Nakladateľstvo Pravda 1977. Debord, G.: Společnost spektaklu. Prel. J. Fulka; P. Siostrzonek. Praha: Nakladatelství :intu: 2007. Farkašová, E.: Na rube plátna. Bratislava: Vydavateľstvo Spolku slovenských spisovateľov 2013.	

Feyerabend, P.: Věda jako umění. Prel. P. Kurka. Praha: JEŽEK 2004. Freud, S.: Nepokojenost v kultuře. Prel. L. Hošek. Praha: Hynek 1998. Hadot, P.: Co je antická filosofie. Prel. M. Křížová. Praha: Vyšehrad 2017. Hippokratés: Vybrané spisy. Prel. H. Bartoš; J. Černá; J. Daneš; S. Fischerová. Praha: OIKOYMENH 2012. Husserl, E.: Filosofie jako přísná věda. Prel. A. Novák. Praha: Togga 2013. Kuhn, T. S.: Štruktúra vedeckých revolúcií. Prel. J. Viceník. Bratislava: Nakladateľstvo Pravda 1981. Leško, V., Mihina, F. a kol.: Dejiny filozofie. Bratislava. Iris 1993. Leško, V.: Dejiny filozofie I. Od Tálesa po Galileiho. Prešov: v. n. 2004, 2007. Leško, V.: Dejiny filozofie II. Od Bacona po Nietzscheho. Prešov: v. n. 2008. McLuhan, M.: Jak rozumět médiím. Extenze člověka. Prel. M. Calda. Praha: Mladá fronta 2011. Patočka, J.: Duchovní člověk a intelektuál. In: Patočka, J.: Péče o duši III. Praha: OIKOYMENH 2002, s. 355 - 371. Popper, K. R.: Otevřená společnost a její nepřátelé I. Platónovo zařikávání. Prel. M. Calda; J. Moural. Praha: OIKOYMENH 2011. Sloterdijk, P.: Kritika cynického rozumu. Prel. M. Szabó. Bratislava: Kalligram 2013. Störig, H. J.: Malé dějiny filozofie. Prel. P. Rezek. Praha: Zvon 1991. Wittgenstein, L.: Filozofické skúmania. Prel. F. Novosád. Bratislava: Nakladateľstvo Pravda 1979. Wright von, H. G.: Humanizmus ako životný postoj. Prel. M. Žitný. Kalligram 2001. Žižek, S.: Mor fantázií. Prel. M. Gálisová; V. Gális. Bratislava: Kalligram 1998.

Course language:

Notes:

Course assessment

Total number of assessed students: 746

A	B	C	D	E	FX
60.59	14.21	12.6	8.58	3.35	0.67

Provides: doc. PhDr. Peter Nezník, CSc.

Date of last modification: 11.07.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: KPE/ INP/17		Course name: Inclusive Pedagogy			
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: 5.					
Course level: I.					
Prerequisites:					
Conditions for course completion:					
Learning outcomes:					
Brief outline of the course:					
Recommended literature:					
Course language:					
Notes:					
Course assessment Total number of assessed students: 85					
A	B	C	D	E	FX
65.88	25.88	4.71	1.18	2.35	0.0
Provides: PaedDr. Michal Novocký, PhD.					
Date of last modification: 20.06.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: ÚCHV/ ACHU/21		Course name: Inorganic Chemistry			
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.					
Prerequisites: ÚCHV/VCHU/15					
Conditions for course completion: Written test in the middle and the end of the semester followed by the oral examination. Active participation on seminars.					
Learning outcomes: Gaining knowledge about the properties and reactivity of elements and their compounds, the periodicity of their properties and the periodicity of the properties of their compounds. Knowledge of the basic physical and chemical properties of elements and their compounds, reactivity, their preparation, production and occurrence.					
Brief outline of the course: Electronic configuration, abundance, use, physical and chemical properties, preparation, reactivity of non-metallic elements hydrogen, halogens, oxygen, sulphur, nitrogen, phosphorus, carbon, silicon, boron and rare gases. Binary and other compounds formed by these elements, their properties and reactivity. Metals and transition elements. Abundance, properties, reactivity, important compounds.					
Recommended literature: Greenwood, N. N., Earnshaw, A: Chemistry of the Elements. Pergamon Press, Oxford, 1984 Atkins O., Overton T., Rourke J., Weller M., Armstrong F.: Inorganic Chemistry, University Press, Oxford, 2006.					
Course language:					
Notes:					
Course assessment Total number of assessed students: 54					
A	B	C	D	E	FX
37.04	33.33	12.96	9.26	7.41	0.0
Provides: prof. RNDr. Vladimír Zelenák, DrSc.					
Date of last modification: 07.02.2022					

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

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:					
Course level: I.					
Prerequisites: 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: 684					
A	B	C	D	E	FX
13.01	21.93	29.82	23.98	6.87	4.39
Provides: prof. RNDr. Juraj Černák, DrSc., RNDr. Miroslava Matiková Maľarová, PhD.					
Date of last modification: 03.05.2015					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					

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:	
Course level: I.	
Prerequisites:	
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 Qualitative Analysis. D.C. Heath and Company 1988.

Course language:

Slovak, English

Notes:

Course assessment

Total number of assessed students: 605

A	B	C	D	E	FX
20.17	12.89	22.15	19.01	25.45	0.33

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

Date of last modification: 22.07.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ UAS/13	Course name: Introduction to Astronomy
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: 4.	
Course level: I.	
Prerequisites:	
Conditions for course completion: To successfully complete the course, the student must demonstrate a sufficient understanding of the basic concept from the field of astronomy and astrophysics. In addition to direct participation in teaching, independent student work is also required within the self-study of topics assigned by the teacher. In order to obtain an assessment and thus also credits, the student must meet the requirements of a continuous written test (with a weight of 30% of the total assessment) and pass an oral exam (with a weight of 70% of the total assessment). Rating scale: A (90-100%), B (80-89%), C (70-79%), D (60-69%), E (50-59%), F (0-49%) .	
Learning outcomes: After completing the lectures and on the basis of the final evaluation, the student will demonstrate adequate mastery of the content standard of the course, which is defined by a brief syllabus of the course and recommended literature. Theoretical mastery of the content of the subject allows him to understand the subject of the study of astronomy and astrophysics, to orient himself in the study of the solar system, the origin and evolution of stars and galaxies. Based on the acquired knowledge, he / she is able to follow up on specialized courses in the further study of astrophysics	
Brief outline of the course: The time schedule of the course content is updated in the electronic bulletin board of the course. <ol style="list-style-type: none"> 1. Astronomy as a science 2. Our place in the Universe 3. Basic astronomical terminology 4. Coordinate systems 5. Time and calendar 6. Astronomical telescopes and instruments 7. Sun as a star 8. Planets in the Solar system 9. Asteroids, comets and meteors 10. Creation and evolution of the stars 11. Extrasolar planets 12. Evolution of the Galaxy and the Universe 	
Recommended literature:	

Čeman, R., Pittich, E., 2002, Vesmír 1 - Slnečná sústava, MAPA Slovakia
 Čeman, R., Pittich, E., 2003, Vesmír 2 - Hviezdy - Galaxie, MAPA Slovakia
 Grygar, J., Horský, Z., Mayer, P., 1979, Vesmír, Mladá fronta
 Kleczek, J., 2002, Velká encyklopedie vesmíru, Academia
 Pittich, E., Kalmančok, D., 1981, Obloha na dlani, Obzor
 Rothery, A. D., 2018, An Introduction to the Solar System, Cambridge University Press
 Vanýsek, V.: 1980, Základy astronomie a astrofyziky, Academia Praha

Course language:

Notes:

Course assessment

Total number of assessed students: 59

A	B	C	D	E	FX
96.61	1.69	1.69	0.0	0.0	0.0

Provides: doc. Mgr. Štefan Parimucha, PhD.

Date of last modification: 21.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ UECH/03	Course name: Introduction to 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: 3.	
Course level: I., II.	
Prerequisites:	
Conditions for course completion: Continuous test. Active participation in exercises - elaboration of semester work. Passing the final examination in the form of a written test.	
Learning outcomes: Introduction to topics in environmental chemistry and basic procedures applied for environmental protection.	
Brief outline of the course: Introduction to Environmental Chemistry Chemical aspects of pollution and environmental problems. Composition and behavior of the atmosphere. Energy balance of the Earth and climate changes. Principles of photochemistry, photoprocesses in the atmosphere. Petroleum, hydrocarbons and coal (characteristics, sources and environmental pollution). Soaps, polymers and synthetic surfactants. Haloorganics and pesticides. Environmental chemistry of some important elements (C, N, S, P, halogens, biologically important metals ...). Environmental chemistry in aqueous media. Aqueous systems, parameters, cycles and their protection. The Earth's crust (rocks, minerals, soils). Natural and artificial radioactivity, utilization. Energy and energy sources (fossil fuels, nuclear, geothermal, solar energy, wind and water energy). Solid waste disposal and recycling.	
Recommended literature: 1. Gary W. van Loon, Stephen J. Duffy: Environmental Chemistry - A Global Perspective, Oxford University Press, Oxford 2003. 2. R. A. Bailey, H. M. Clark, J. P. Ferris, S. Krause, R. L. Strong: Chemistry of the Environment, Academic Press, San Diego 2002. 3. G. Schwedt: The Essential Guide to Environmental Chemistry, Wiley and Sons, London 2001. 4. R. N. Reeve, J. D. Barnes: General Environmental Chemistry, Wiley, London 1994. 5. G. Burton, J. Holman, G. Pilling, D. Waddington: Chemical Storylines, Heinemann, Oxford, London 1994.	
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: 223

A	B	C	D	E	FX
49.78	21.52	14.8	8.07	5.83	0.0

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

Date of last modification: 21.01.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ UVF/05	Course name: Introduction to General Physics
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.	
Prerequisites:	
Conditions for course completion: Terms and conditions of assessment during the semester -participation in classes in accordance with study regulations and teacher's instructions -active participation at seminars and exercises -submitting all the assignments in accordance with teacher's instruction -tests during the semester Final assessment: -based on assessment during the semester Conditions for successful completion of the course: -participation in lessons in accordance with the study regulations and teacher's instructions -achieving the level higher than 50 % in assessment during the semester and in final assessment	
Learning outcomes: By the end of the course student is able to solve problems connected with mechanics, molecular physics and thermodynamics. In solving problems student is able to apply digital tools for data collection, videomeasurement and computer modelling and data processing and their analysis.	
Brief outline of the course: The course is an auxiliary subject to the course General physics 1 - Mechanics, Molecular Physics and Thermodynamics aimed to development of conceptual understanding and problem solving connected with the following areas: 1. Kinematics and dynamics of motion along a line and two-dimensional motion of particle. Equation of motion. 2. Gravitational field. Projectile motion. 3. Work, power and energy. Law of energy conservation. 4. Rotational motion. Equation of rotational motion. 5. Law of momentum conservation and angular momentum conservation. 6. Deformation. Hook's law. 7. Fluid mechanics. 8. Gases. Ideal gas laws. 9. Basics of thermodynamics. First law of thermodynamics. 10. Heat and heat exchange.	

11. Liquids. Surface tension. 12. Changes of state.					
Recommended literature: CUMMINGS, Karen, LAWS, Priscilla, REDISH, Edward, COONEY, Patrick: Understanding Physics, John Wiley & Sons, 2004					
Course language: English					
Notes:					
Course assessment Total number of assessed students: 327					
A	B	C	D	E	FX
37.31	20.49	24.16	12.84	4.89	0.31
Provides: doc. RNDr. Zuzana Ješková, PhD.					
Date of last modification: 15.09.2021					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ UVF2/07	Course name: Introduction to General Physics 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.	
Prerequisites:	
Conditions for course completion: Terms and conditions of assessment during the semester -participation in classes in accordance with study regulations and teacher's instructions -active participation at seminars and exercises -submitting all the assignments in accordance with teacher's instruction -tests during the semester Final assessment: -based on assessment during the semester Conditions for successful completion of the course: -participation in lessons in accordance with the study regulations and teacher's instructions -achieving the level higher than 50 % in assessment during the semester and in final assessment	
Learning outcomes: By the end of the course student is able to solve problems and explain phenomena and experiments connected with selected areas of Electricity and Magnetism.	
Brief outline of the course: The course is an auxiliary subject to the course General physics 2 - Electricity and Magnetism aimed to development of conceptual understanding and problem solving connected with the following areas: 1. Electric field. Coulomb's law. 2. Work, electric potential energy, electric potential. 3. Electric capacitance and capacitors. 4. Electric current. Ohm's law, Kirchhoff's laws. 5. Work and power. Energy and efficiency of sources of electromotive force 6. Magnetic field. 7. Interaction between magnetic field and electric charge. 8. Transient phenomena in RC circuit. 9. Electromagnetic induction. 10. Transient phenomena in RL circuit. 11. Alternating current circuits. 12. Resonance in series and parallel circuits.	
Recommended literature:	

Matsushita, Teruo. Electricity and Magnetism, Springer 2017 CUMMINGS, Karen, LAWS, Priscilla, REDISH, Edward, COONEY, Patrick: Understanding Physics, John Wiley & Sons, 2004					
Course language: English					
Notes:					
Course assessment Total number of assessed students: 270					
A	B	C	D	E	FX
39.26	22.59	20.74	8.15	9.26	0.0
Provides: doc. RNDr. Zuzana Ješková, PhD.					
Date of last modification: 15.09.2021					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: ÚFV/ ZMF/17		Course name: Introduction to Mathematics for Physicists			
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: 3					
Recommended semester/trimester of the course: 1.					
Course level: I.					
Prerequisites:					
Conditions for course completion:					
Learning outcomes:					
Brief outline of the course:					
Recommended literature:					
Course language:					
Notes:					
Course assessment Total number of assessed students: 287					
A	B	C	D	E	FX
40.77	21.25	18.47	10.45	8.71	0.35
Provides: RNDr. Tomáš Lučivjanský, PhD., doc. RNDr. Jozef Hanč, PhD.					
Date of last modification: 16.11.2021					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

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.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 2012	
abs	n
88.37	11.63
Provides: doc. RNDr. Marián Kireš, PhD.	
Date of last modification: 30.08.2022	
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚMV/ MTFa/15	Course name: Mathematics I for physicists
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.	
Prerequisites:	
Conditions for course completion: To complete the course, it is necessary to demonstrate the acquirement of basic mathematical terms and the ability to solve problems from selected thematic units. The evaluation of the subject is according to the results from the semester and in view of the results of the written final test. During the semester, students write tests at all seminars (together 20 points) and two extensive tests (together 50 points). It is necessary to obtain at least 28 points during the semester. Then students may write the exam. To pass the exam, it is necessary to obtain at least 12 points from the maximum number of 30 points. The scale for student evaluation is as follows: 100-80-A, 79-70-B, 69-60-C, 59-50-D, 49-40-E. If a student does not achieve the required minimal number of points from the exam test (12 points) and during the semester (together 28 points), he/she is evaluated by FX.	
Learning outcomes: After completing the course, the student can use basic mathematical terms, can solve various equations and inequations, and is acquainted with basic mathematical knowledge from the differential and integral calculus, and is able to apply the theory in concrete exercises.	
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 applications. 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: 54					
A	B	C	D	E	FX
25.93	12.96	29.63	16.67	11.11	3.7
Provides: RNDr. Jana Borzová, PhD., RNDr. Barbora Klemová, RNDr. Diana Trellová					
Date of last modification: 18.04.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚMV/ MTFb/15	Course name: Mathematics II for physicists
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: 4	
Recommended semester/trimester of the course: 2.	
Course level: I.	
Prerequisites: ÚMV/MTFa/15	
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: 71 p. - 80 p. B: 63 p. - 70 p. C: 56 p. - 62 p. D: 49 p. - 55 p. E: 42 p. - 48 p.	
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:

1. Hughes-Hallett, D., et al.: Applied Calculus. John Wiley & Sons, Inc., 2010.
2. Rogers, R., C.: The Calculus of Several Variables. 2011.

Course language:

Slovak

Notes:

Course assessment

Total number of assessed students: 20

A	B	C	D	E	FX
50.0	20.0	20.0	5.0	5.0	0.0

Provides: doc. RNDr. Stanislav Lukáč, PhD., RNDr. Stanislav Basarik, Mgr. Barbora Hannelová

Date of last modification: 17.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ SDFM1/15	Course name: Methods of Data Processing in Physics
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: 3	
Recommended semester/trimester of the course: 3.	
Course level: I.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course: <ol style="list-style-type: none"> 1. Numerical processes and their errors. Particular properties of computer representation of numerical data. Introduction in Matlab/Octave. 2. Approximation and interpolation of a function. Algebraic multinomials. Newton, Lagrange, Hermit and spline interpolation. Selection of interpolation knots. 3. Numerical methods for calculation of definite integral – rectangular, trapezoidal, Simpson. 4. Numerical differentiation. 5. Numerical solution of ordinary differential equations – Euler's method and modifications, Runge-Kutta method. 6. Approximate solution of non-linear equations. Roots separation, simple iteration and its convergency. Tangent, secant and combined methods. 7. Iterative solution of linear system of algebraic equations, Gauss method. 8. Linear regression. Regression models, least-square criterion. 10. Non-linear regression models. 8. Basics of probability theory and mathematical statistics - systematic and random errors, Gaussian distribution, three-sigma rule, central limit theorem. 11. Computer simulation of real processes - Monte-Carlo method (principles, random quantities, pseudo-random number generators). 12. Simulation of particle transport through solid. 	
Recommended literature: <ol style="list-style-type: none"> 1. Buchanan J. L., Turner P. R.: Numerical Methods and Analysis. McGraw-Hill, Inc., New York, 1992. 2. Hrach R.: Počítačová fyzika I,II. Skriptum PF UJEP. Ed. stredisko UJEP, Ústí nad Labem, 2003. 3. Petrovič P., Nadrchal J., Petrovičová J.: Programovanie a spracovanie dát I, II. Edičné stredisko UPJŠ, Košice 1989. 4. Petrovič P.: Fyzika I – Vybrané kapitoly z klasickej fyziky a počítačovej fyziky. Vydavateľstvo equilibria, Košice, 2009. 	

4. Siegel A. F.: Statistics and Data Analysis. An Introduction. J. Wiley&Sons, NY, 1988.

Course language:

slovak, basics of english

Notes:

Course assessment

Total number of assessed students: 4

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

Provides: doc. RNDr. Erik Čižmár, PhD.

Date of last modification: 21.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/MFYU/15	Course name: Methods of Physical Problems Solving
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: 5.	
Course level: I.	
Prerequisites:	
Conditions for course completion: Summary evaluation based on ongoing assessment: <ol style="list-style-type: none"> 1. Practical ongoing assignments for given topics and their defense (at least 50% needed) 2. Active participation during face-to-face contact learning in classical or virtual classroom (3 absences allowed) and during online learning (no absence, uploading all ongoing assignments) 	
Learning outcomes: The student will gain the following knowledge and skills <ol style="list-style-type: none"> 1. overview of qualitative, quantitative and experimental methods of solving physical problems 2. can model a given physical problem and apply appropriate methods of solution according to the nature of the physical problem 3. can effectively use digital technologies on PC, mobile and tablet in solving physical problems. 	
Brief outline of the course: Introduction to the subject <ol style="list-style-type: none"> 1. Overview of approaches, methods and means, sources of physical problems, competitions Qualitative approaches in solving <ol style="list-style-type: none"> 2. Simple thought modeling and Fermi estimates, 3. Dimensional analysis, scaling 4. Application of symmetry and conservation laws 5. Graphic methods Experiment and digital technologies in solving <ol style="list-style-type: none"> 6. Animations and simple simulations (Geogebra, Phet, Workbench, Physlets) 7. Video analysis (Tracker), iconographic modeling (VnR, Coach) 8. Computer-aided, remote and virtual experiments (PC, tablet, mobile) Quantitative approaches in solving <ol style="list-style-type: none"> 9. Models in the form of differential equations - computer modeling (Sage, Jupyter) 10. Symbolic and numerical solutions (Sage, Jupyter), More advanced approaches to solutions <ol style="list-style-type: none"> 11. Qualitative approach through the theory of dynamical systems 12. Variational approaches (Lagrange, Hamilton) 	

13. 2D and 3D visualization and verification of solutions using a computer (Sage, Vpython)					
Recommended literature: 1. Halliday, D., Resnick, R., Walker, J.: Fyzika 1-5, Akademické nakladatelství, VUTIUM, ISBN: 8021418680, 2007 2. Moore, T. A. Six Ideas that Shaped Physics: Units C, N, R, E, Q, T. 3rd ed., McGraw-Hill, Boston, 2017, http://www.physics.pomona.edu/sixideas/ 3. Mahajan, S. The Art of Insight in Science and Engineering: Mastering Complexity. MIT Press, Boston, 2014. 4. Weinstein, L. Guesstimation: Solving Today's Problems on the Back of a Napkin. Princeton University Press Princeton, 2012. 5. Morin, D. Introduction to Classical Mechanics: With Problems and Solutions. Cambridge University Press. 2008 6. current information from web sites related to collections of physics problems and competitions, digital technologies for problem solving					
Course language: Slovak, English					
Notes:					
Course assessment Total number of assessed students: 11					
A	B	C	D	E	FX
81.82	9.09	9.09	0.0	0.0	0.0
Provides: doc. RNDr. Jozef Hanč, PhD.					
Date of last modification: 27.01.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ MTFM/20	Course name: Modern Trends in Physics
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: 2	
Recommended semester/trimester of the course: 4.	
Course level: I.	
Prerequisites:	
Conditions for course completion: To successfully complete the course (full-time, if necessary distance), the student must demonstrate a sufficient understanding of the basic concepts and laws of physics, which were focused on lectures, elaboration of semester work on specified topics and successful oral examination and written processing and presentation of one topic, which is in the content of the subject. Credit assessment takes into account the scope of teaching (2 hours of lectures and self-study 2 credits). Rating scale complied with 100-50 failed 49-0	
Learning outcomes: After completing the lectures and exercises, the student will have sufficient knowledge of those parts of physics that have been included in the content of lectures.	
Brief outline of the course: Week 1-3: Selected lectures in theoretical physics and astrophysics Week 4-6: Selected lectures in nuclear physics Weeks 7-9: Selected lectures in biophysics Week 10-12: Selected lectures on condensed matter physics Week 13.-14: Presentation of students' work and discussion.	
Recommended literature: The literature is specified at the beginning of the semester according to selected topics.	
Course language: english	
Notes: Presence form represents a standart form for the course, if a need arises, the course is performed using MS Teams.	

Course assessment	
Total number of assessed students: 16	
abs	n
100.0	0.0
Provides: prof. RNDr. Peter Kollár, DrSc.	
Date of last modification: 22.11.2021	
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: KPE/MMKV/17		Course name: Multiculturalism and Multicultural Education			
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.					
Prerequisites:					
Conditions for course completion:					
Learning outcomes:					
Brief outline of the course:					
Recommended literature:					
Course language:					
Notes:					
Course assessment Total number of assessed students: 191					
A	B	C	D	E	FX
41.88	42.93	13.61	1.05	0.52	0.0
Provides: PaedDr. Michal Novocký, PhD.					
Date of last modification: 20.06.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/OCHU/21	Course name: Organic chemistry
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.	
Prerequisites: ÚCHV/VCHU/15 or ÚCHV/VCHU/14 or ÚCHV/VCHU/10 or ÚCHV/VACH/10	
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. 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: 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: Chemical bonding Hybridization and Bonding Covalent bonds Double bonds and Triple Bonds Structural Formulas of Organic Molecules Polar Covalent Bonds and Electronegativity Constitutional Isomers Alkenes Electrophilic Additions Strong Brønsted Acids Lewis Acids (non-Proton Electrophiles) Electrophilic Halogen Reagents Other Electrophilic Reagents Reduction Oxidation Radical Additions Allylic Substitution Alkynes Addition Reactions Hydrogenation Electrophiles Hydration & Tautomerism Hydroboration Nucleophilic Addition & Reduction Acidity of Terminal Alkynes (Substitution of H) Alkyl Halides General Reactivity Substitution (of X) SN2 Mechanism SN1 Mechanism Elimination (of HX) Summary of Substitution vs. Elimination Substitution by Metals Elimination Reactions of Dihalides Alcohols Reactions of Alcohols Substitution of the Hydroxyl H Substitution of the Hydroxyl Group Elimination of Water Oxidation of Alcohols Reactions of Phenols Acidity of Phenols Ring Substitution of Phenols Oxidation to Quinones Aromatic compounds Electrophilic Substitution A Substitution Mechanism Reactions of Substituted Benzenes Reaction Characteristics Reactions of Disubstituted Rings Reactions of Substituent Groups Nucleophilic Substitution, Elimination & Addition Reactions Amines Basicity of Nitrogen Compounds Acidity of Nitrogen Compounds Important Reagent Bases Reactions of	

Amines Electrophilic Substitution at Nitrogen Preparation of 1°-Amines Preparation of 2° & 3°-Amines Reactions with Nitrous Acid Reactions of Aryl Diazonium Intermediates Elimination Reactions of Amines Oxidation States of Nitrogen Basic information: Aldehydes & Ketones Carboxylic Acids Derivatives of Carboxylic acids Natural products					
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 Edition, 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: 52					
A	B	C	D	E	FX
11.54	7.69	19.23	50.0	9.62	1.92
Provides: RNDr. Slávka Hamuláková, PhD., doc. RNDr. Miroslava Martinková, PhD., doc. RNDr. Mária Vilková, PhD.					
Date of last modification: 04.08.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ POCHU/15	Course name: Organic chemistry - Lab.
Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: 4 Per study period: 56 Course method: present	
Number of ECTS credits: 4	
Recommended semester/trimester of the course: 3.	
Course level: I.	
Prerequisites: ÚCHV/OCHU/03 or ÚCHV/OCHU/21	
Conditions for course completion: 100% participations in practical exercises. Two written tests 2 x 25 pts (a minimum of 13 points must be obtained in each test), twelve reports 12 x 2 pts, laboratory skills 12 pts, short quizzes and questions 14 pts. A 100 pts. in total. Assessment A: 91-100; B: 81-90; C: 71-80; D: 60-71; E: 51-60; FX: 0-50 pts.	
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. <ol style="list-style-type: none"> 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: <ol style="list-style-type: none"> 1. Handout with experimental procedures http://kekule.science.upjs.sk/pochu. 2. Organic chemistry lectures. 	
Course language:	

Slovak					
Notes:					
Course assessment					
Total number of assessed students: 228					
A	B	C	D	E	FX
53.07	28.07	11.4	6.58	0.88	0.0
Provides: RNDr. Slávka Hamuláková, PhD., RNDr. Ján Elečko, PhD., RNDr. Jana Špaková Raschmanová, PhD., RNDr. Mariana Budovská, PhD.					
Date of last modification: 28.01.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

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:	
Course level: I.	
Prerequisites:	
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 α -Carbon Mechanism of Electrophilic α -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 α 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	34.47	3.09

Provides: doc. RNDr. Miroslava Martinková, PhD.

Date of last modification: 05.02.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: KPE/ Pg/15		Course name: Pedagogy			
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: 2					
Recommended semester/trimester of the course: 3., 5.					
Course level: I.					
Prerequisites:					
Conditions for course completion:					
Learning outcomes:					
Brief outline of the course:					
Recommended literature:					
Course language:					
Notes:					
Course assessment Total number of assessed students: 961					
A	B	C	D	E	FX
23.1	29.24	23.41	13.84	8.84	1.56
Provides: PaedDr. Michal Novocký, PhD.					
Date of last modification: 20.06.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: ÚCHV/ FCHU/21		Course name: Physical Chemistry			
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: 5					
Recommended semester/trimester of the course: 4.					
Course level: I.					
Prerequisites: ÚCHV/VCHU/14 or ÚCHV/VCHU/10 or ÚCHV/VACH/10 or ÚCHV/VCHU/15					
Conditions for course completion: Active participation in seminars. Two partial tests from computational seminars, each must be mastered at A-E. In the case of distance learning, it is necessary to prepare 2 assignments, each must be mastered at 80%. Examination, understanding of three thematic areas of the subject (thermodynamics, electrochemistry, kinetics).					
Learning outcomes: Acquirement of the basics knowledgements of physical chemistry within the chapters: thermodynamics, phase equilibria, chemical equilibria, electrochemistry, chemical kinetics.					
Brief outline of the course: Fundamental concepts of thermodynamics, thermochemistry, chemical equilibrium, phase equilibria and diagrams, laws for ideal gas and reals gases, liquids, solutions, solutions of electrolytes. Electrochemistry: ionics and electrodics. Electrodes and electrochemical cells, corrosion. Chemical kinetics, catalysis. Adsorption.					
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, 1996 W.J. Moore: Physical Chemistry, Longman, London 1972 and newer editions					
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: 25					
A	B	C	D	E	FX
48.0	24.0	12.0	8.0	8.0	0.0

Provides: RNDr. Andrea Morovská Turoňová, PhD., RNDr. Ján Macko, PhD., RNDr. Ivana Šišoláková, PhD.
Date of last modification: 24.11.2021
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

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:	
Course level: I.	
Prerequisites: 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 processes in electrolyte solutions. Charge transfer in electrolyte solutions. Nonequilibrium homogeneous processes. Transport processes in electrolyte solutions. Conductance and molar conductivity. Hindering effects. Transport numbers. Equilibrium in heterogeneous electrochemical systems. Processes on charged interfaces. Electrochemical cells and fuel cells. Classification of electrode types. Concentration cells. Electrolysis. Electrochemical power sources. Potentiometry. Electrical double layer. Surface tension. Chemical kinetics. Homogeneous processes. Reaction rate. Reaction order. Classification of chemical reactions. Elementary chemical reactions. Mechanism and kinetics equations of complicated chemical processes. Methods of rate law determination. Theory of chemical kinetics.	

<p>Temperature dependence of reaction rates. Collision theory. Activated complex theory. Chain reactions. Structure and rate laws of chain reactions. Explosion. Polymerisation reactions. Photochemical reactions. Catalysis. Theory of homogeneous catalysis. Chemical oscillation reactions. Heterogeneous processes. Diffusion. Physical and chemical adsorption. Adsorption and diffusion. Processes in heterogeneous electrochemical systems. Electrode kinetics, activation and diffusive mechanism of charge transfer.</p> <p>Application of theoretical relationships on the solving of concrete problems and on the calculation of examples during seminars.</p>																	
<p>Recommended literature:</p> <p>T. Engel, P. Reid : Physical Chemistry, Pearson Educat. Inc., San Francisco 2006</p> <p>P.W. Atkins : Physical Chemistry, Oxford University Press, Oxford 1986, 1990, 1994, 1998</p> <p>W.J. Moore : Physical Chemistry, Longman, London 1972 and newer editions</p>																	
<p>Course language:</p> <p>Slovak language</p>																	
<p>Notes:</p> <p>Teaching is carried out in person or, if necessary, remotely using the bbb or MS Teams tool. The form of teaching is specified by the teacher at the beginning of the semester, updated continuously.</p>																	
<p>Course assessment</p> <p>Total number of assessed students: 605</p> <table border="1"> <thead> <tr> <th>A</th><th>B</th><th>C</th><th>D</th><th>E</th><th>FX</th></tr> </thead> <tbody> <tr> <td>15.7</td><td>18.18</td><td>22.15</td><td>19.01</td><td>20.66</td><td>4.3</td></tr> </tbody> </table>						A	B	C	D	E	FX	15.7	18.18	22.15	19.01	20.66	4.3
A	B	C	D	E	FX												
15.7	18.18	22.15	19.01	20.66	4.3												
<p>Provides: prof. RNDr. Renáta Oriňáková, DrSc., RNDr. Jana Shepa, PhD., RNDr. Radka Gorejová, PhD., RNDr. Ján Macko, PhD., RNDr. Ivana Šišoláková, PhD.</p>																	
<p>Date of last modification: 25.11.2021</p>																	
<p>Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.</p>																	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ ZFP1a/03	Course name: Physics Practical I
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.	
Prerequisites:	
Conditions for course completion: The active work during semester and hand in all reports. Vindication of reports.	
Learning outcomes: Developing proper laboratory habits, skills and verify their theoretical knowledge.	
Brief outline of the course: The goal of this laboratory exercises is to familiarize the students with measurement methods, with kinds and calculus of mistakes, with measured results processing, and with presentation of results. The students gain practical skills, and verify their theoretical knowledge of first semester introductory physics course. They develop proper laboratory habits. Laboratory assignment: <ol style="list-style-type: none"> 1. Density measurements of liquids and solids. 2. Radius measurements of spherical cap. Measurements of surface using planimeter. 3. Gravitational acceleration measurements using mathematical and physical pendulum. 4. Moment of inertia measurement using physical and torsion pendulum. 5. Measurements of Young's modulus. 6. Measurement of coefficient of viscosity. 7. Measurement of the speed of sound. 8. Measurements of general gas constant and Boltzmann constant. 9. Measurements of thermal expansivity of air. 10. Measurements of thermal capacity of matter. 11. Measurement of the surface tension. 	
Recommended literature: Degro, J., Ješková, Z., Onderová, L., Kireš, M.: Základné fyzikálne praktikum I. (Basic physical measurements I), Ed. PF UPJŠ Košice 2007. Standards STN ISO 31. Slovenský inštitút normalizácie v Bratislave (Slovak institute of technical standards in Bratislava), 1997.	

Ješková, Z.: Computer based experiments in thermodynamics using IP COACH,ed. PF UPJŠ in Košice, 2004.					
Course language: english					
Notes:					
Course assessment Total number of assessed students: 275					
A	B	C	D	E	FX
57.45	25.82	12.73	3.27	0.73	0.0
Provides: doc. RNDr. Adriana Zeleňáková, PhD., doc. RNDr. Marián Kireš, PhD., doc. RNDr. Ján Füzér, PhD., doc. RNDr. Jozef Hanč, PhD.					
Date of last modification: 29.03.2020					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zeleňák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ ZFP1b/03	Course name: Physics Practical II
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: 3.	
Course level: I.	
Prerequisites: ÚFV/ZFP1a/03	
Conditions for course completion: To successfully complete the course, the student must measure at least 11 experimental tasks, process and analyze the measured results and evaluate the experimental results in the form of a protocol. The condition for the implementation of another experimental task is the submission of a protocol from the previous exercise. The condition for the implementation of the practical task is sufficient theoretical training at home. If the student is not ready for the task in advance, the teacher can send him home and the student must replace the exercise at another time. The credit evaluation of the course takes into account the following student workload: 1 credit: self-study of recommended literature and subsequent direct teaching 1 credits: realization of experimental exercise and subsequent defense of measuring procedure - it is obligatory to complete all practical tasks in the semester, 1 credit: elaboration and submission of protocols from measurements, which are evaluated.	
Learning outcomes: By completing the course, the student will get acquainted with selected physical experiments in the field of electricity and magnetism and supplement the theoretical knowledge acquired in the course General Physics in a practical way. The result of education is: a) Complementing and summarizing knowledge and experimental skills in the field of electricity and magnetism. b) Gaining practical experience with recording, analysis and interpretation of experimental data from practical measurements. c) Gaining experience with the presentation of experimental results in the form of a measurement protocol.	
Brief outline of the course: Students on practical exercises are working in pairs experimental tasks in the field of electrical, electromagnetic and magnetic properties of matters. 1. Electrical Resistivity 2. Self - and Mutual Inductance and Capacity	

3. Serial and Parallel Resonance 4. Thermal Dependence of Selected Electrical Phenomena in Solids 5. The Characteristics of Semiconductor Diod 6. The Characteristics of Semiconductor Bipolar Transistor 7. Magnetic Hysteresis 8. Hall Constant Measurements 9. Measurements of Horizontal Component of Earth Magnetic Field 10. Measuring characteristics of switching components 11. Measuring the properties of optoelectronic components 12. Electric current in liquids and electrolysis					
Recommended literature: 1. Tumanski S, Handbook of magnetic measurements, CRC press, 2011. 2. Fiorillo F, Characterization and Measurement of Magnetic Materials, Elsevier, 2004.					
Course language: english					
Notes: Teaching is carried out in person. If necessary, part of the teaching can be realized remotely using the MS Teams or BBB tool. At the beginning of the semester, the teacher sets the conditions for completing and mastering the course.					
Course assessment Total number of assessed students: 249					
A	B	C	D	E	FX
66.27	19.68	12.05	1.61	0.0	0.4
Provides: doc. RNDr. Adriana Zelenáková, PhD., doc. RNDr. Ján Füzér, PhD.					
Date of last modification: 30.09.2021					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: ÚFV/ ZFP1c/14		Course name: Physics Practical III			
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: 4.					
Course level: I.					
Prerequisites:					
Conditions for course completion: Measurements of experimental tasks, their evaluation in the form of a written report, which must be defended. As a part of evaluation there is also a good theoretical preparation for the measurement of the task.					
Learning outcomes: To gain some physical inside into some of the concepts presented in the lectures. b. To gain some practice in data collection, analysis and interpretation of resumance. c. To gain experience and report writing presentation and results.					
Brief outline of the course: Oscilations. Pendulum. Composition and decomposition of oscillations. Resonance. The speed of sound. Refractive index. Lense's focal length. Interference. Diffraction. Diffraction and reflection of waves. Polarization. The speed of light. Quantum optics.					
Recommended literature: Degro,J., Ješková, Z., Onderová,E., Kireš,M.: Základné fyzikálne praktikum I, PF UPJŠ Košice, 2006 P. Kollár a kol. Základné fyzikálne praktikum II, PF UPJŠ Košice, 2006 J. Brož Základy fyzikálných měření, SPN Praha, 1981.					
Course language: slovak, english					
Notes:					
Course assessment Total number of assessed students: 94					
A	B	C	D	E	FX
68.09	19.15	7.45	2.13	3.19	0.0
Provides: doc. RNDr. Marián Kireš, PhD., doc. RNDr. Ján Füzer, PhD.					
Date of last modification: 01.02.2022					

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ ZFP1d/14	Course name: Physics Practical IV
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: 5.	
Course level: I.	
Prerequisites:	
Conditions for course completion: - a check of the theoretical preparation for measuring the given task - tests for tasks no. 2 (2x), 4,5,6,8, tests from the theoretical part - basic characteristics of radiation and detectors, each test with a minimum success rate of 51%, - measurement of tasks, elaboration and submission of protocols of measured tasks - the overall evaluation is the sum of the evaluations of the individual tasks	
Learning outcomes: The student will acquire knowledge and practical skills about the registration of various types of ionizing radiation and verify the knowledge acquired in the subject General Physics IV - Atomic and Nuclear Physics.	
Brief outline of the course: 1. Introduction to measurements. 2. Dosimetry measurements. 3. Statistic distribution of measured quantities. 4. Measurement time scale selection. 5. Absorption of beta rays. 6. Backward scattering of beta rays. 7. Scintillation gamma spectrometer. 8. Emulsion detector. 9. Franck Hertz experiment. 10. Beta - spectroscopy. 11. Energy dependence of the gamma-absorption coefficient. 12. MEDIPIX. 13. Interaction of photons with matter.	
Recommended literature: 1. J.Vrláková, S.Vokál: Základné fyzikálne praktikum III, skriptá PF UPJŠ, Košice, 2012, dostupné na http://www.upjs.sk/public/media/5596/Zakladne-fyzikalne-praktikum-III.pdf	

Course language: slovak					
Notes:					
Course assessment Total number of assessed students: 95					
A	B	C	D	E	FX
83.16	8.42	5.26	3.16	0.0	0.0
Provides: doc. RNDr. Janka Vrláková, PhD., doc. RNDr. Adela Kravčáková, PhD.					
Date of last modification: 23.08.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: ÚFV/ FDE/15		Course name: Physics in Demonstration Experiments			
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.					
Prerequisites:					
Conditions for course completion: Seminar work – a project dealing with hands-on experiments and their role in Physics teaching.					
Learning outcomes: The goal of the course is to get better the understanding of basic physical concepts and phenomena through demonstrational physical experiments.					
Brief outline of the course: The course is aimed at the conceptual understanding of basic physical concepts and phenomena with the help of selected demonstrational experiments. The experiments concern the content of the subject Introductory physics and their realization is based on students' active participation.					
Recommended literature: 1. D.Halliday, R.Resnick, J.Walker: Fyzika, VUTIUM, Brno, 2000 2.K.Cummings, P.W.Law, E.F.Redish, P.J.Cooney: Understanding Physics, John Wiley & Sons, Inc., 2004 3.P.G.Hewitt: Conceptual Physics, tenth edition, Pearson, Addison Wesley, 2006 4.L.Onderová, M.Kireš, Z.Ješková, J.Degro: Praktikum školských pokusov II, PF UPJŠ, 2004					
Course language: Slovak					
Notes:					
Course assessment Total number of assessed students: 42					
A	B	C	D	E	FX
90.48	2.38	4.76	2.38	0.0	0.0
Provides: doc. RNDr. Marián Kireš, PhD.					
Date of last modification: 15.04.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice							
Faculty: Faculty of Science							
Course ID: ÚCHV/ ADP/03		Course name: Porous materials and their applications					
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., III.							
Prerequisites:							
Conditions for course completion: Written test in the middle and the end of the semester.							
Learning outcomes: To make the acquaintance of various types of advanced porous solids and basic methods for their investigation. To get up the students with the methods used in characterisation of specific surface area and pore size of different types of porous materials.							
Brief outline of the course: Terminology and principal terms associated with powders, porous solids and adsorption. Methodology of adsorption at the gas-solid interface, liquid-solid interface. Assessment of surface area and porosity. Inorganic materials (active carbon, metal oxides, zeolites, clay minerals, new advanced materials) and phenomenon of adsorption. Application in the industry and everyday life.							
Recommended literature: 1. F. Rouquerol, J. Rouquerol, K. Sing: Adsorption by powders and porous solids, Academic press, London, UK, 1999 2. S. J. Gregg, K.S.W. Sing: Adsorption, surface area and porosity, Academic Press, London,, UK, 1982. 3. V. Zelenák: Adsorption and porosity of solid substances, internal study text, PF UPJŠ, 2020.							
Course language:							
Notes: The course is standardly realized in full-time form, in case of necessary circumstances by distance.							
Course assessment Total number of assessed students: 100							
A	B	C	D	E	FX	N	P
77.0	10.0	4.0	0.0	0.0	0.0	0.0	9.0
Provides: prof. RNDr. Vladimír Zelenák, DrSc.							
Date of last modification: 21.11.2021							

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: KPPaPZ/PP/15	Course name: Positive Psychology
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., 6.	
Course level: I.	
Prerequisites:	
Conditions for course completion: Assessment is based on interim evaluation. The subject will be taught in both present and distance format. Up-to-date information concerning the subject for the given academic year can be found on the electronic board of the subject in the Academic information system of the UPJŠ.	
Learning outcomes: Students will acquire basic knowledge concerning the reasons for founding Positive psychology, its main theory, current research, as well as application of Positive psychology as a new and rapidly developing field within psychology. Students will also gain experience in applying critical thinking to the challenges and issues that Positive psychology brings and raises in the context of the individual in contemporary society. Emphasis is placed on the ability to critically evaluate current topics of positive psychology.	
Brief outline of the course: <ol style="list-style-type: none"> 1. Different perspectives on well-being and happiness in psychology 2. Main theoretical approaches to positive psychology 3. Positive emotions and positivity 4. Meaningfulness 5. Positive interpersonal relations 6. Post-traumatic growth 7. Hope and optimism 8. Gratitude 9. Spirituality as a personality dimension 10. Wisdom 11. Positive institutions 12. New themes and topics in PP 	
Recommended literature: Brewer, M. B, Hwestone, M: Emotion and Motivation, Blackwell, 2004 Deci, E., Ryan R. M., Handbook of Self – Determination Research, Rochester, 2002 Křivohlavý, J.: Pozitivní psychologie. Praha, Portál, 2003 Křivohlavý, J.: Psychologie vděčnosti a nevďčnosti. Praha, Grada, 2007 Křivohlavý, J.: Psychologie moudrosti a dobrého života, Praha, Grada, 2012	

Křivohlavý, J.: Psychologie pocitu štěstí, Grada, 2013 McAdams, D. P., The Person, New York, 2002 Seligman, M. E. P., & Csikszentmihalyi, M. (Eds.). (2000). Positive psychology [Special issue] American Psychologist, 55(1). Říčan, P.: Psychologie náboženství a spirituality, Praha, Portál, 2007 Slezáčková, A.: Průvodce pozitivní psychologií, Praha, Grada, 2012					
Course language:					
Notes:					
Course assessment Total number of assessed students: 408					
A	B	C	D	E	FX
98.28	1.23	0.25	0.0	0.25	0.0
Provides: Mgr. Jozef Benka, PhD.					
Date of last modification: 24.06.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: ÚCHV/PACHU/03		Course name: Practical from Inorganic Chemistry			
Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: 4 Per study period: 56 Course method: present					
Number of ECTS credits: 4					
Recommended semester/trimester of the course: 2.					
Course level: I.					
Prerequisites: ÚCHV/VCHU/14 or ÚCHV/VCHU/15 or ÚCHV/VCHU/10 or ÚCHV/VACH/10					
Conditions for course completion:					
Learning outcomes: Acquisition of practical skills and knowledge necessary for work in a chemical laboratory in the preparation of inorganic and other compounds, in the preparation of solutions, methods of distillation and other basic techniques of work in the laboratory. Students will also be able to perform basic characterization of substances and proof reactions.					
Brief outline of the course: The utilization of common laboratory techniques for preparation of elements (H ₂ , O ₂ , Cu, Ni), oxides(CO ₂ , Al ₂ O ₃ ·xH ₂ O), nitrides(Mg ₃ N ₂), acids (HNO ₃ , H ₃ BO ₃), salts((NH ₄) ₂ SO ₄ , KMnO ₄), binary salts(NH ₄)Fe(SO ₄) ₂ ·12H ₂ O), halides (CuCl, CuCl ₂ ·2H ₂ O, CuBr ₂) and coordination compounds [Cu(NH ₃) ₄]SO ₄ ·H ₂ O, K ₃ [Al(C ₂ O ₄) ₃]·3H ₂ O).					
Recommended literature: J. Černák, J. Bubanec, M. Dzurillová, V. Zeleňák: Praktikum z anorganickej chémie. UPJŠ Košice, 1999. Z. Vargová, J. Kuchár: Základné praktikum z anorganickej chémie, UPJŠ, Košice, 2009. Z.Vargova, M.Almáši, J. Kuchár, J.Dinajová: Základné laboratórne cvičenia z anorganickej chémie, ŠafárikPress, 2020.					
Course language:					
Notes:					
Course assessment Total number of assessed students: 623					
A	B	C	D	E	FX
53.45	27.29	13.96	2.73	1.77	0.8
Provides: doc. RNDr. Juraj Kuchár, PhD., RNDr. Martin Vavra, PhD., RNDr. Miroslava Matiková Maľarová, PhD., Mgr. Michaela Rendošová, PhD.					
Date of last modification: 22.07.2022					

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/PFCU/03	Course name: Practical in Physical Chemistry
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: 4	
Recommended semester/trimester of the course: 5.	
Course level: I., II.	
Prerequisites: ÚCHV/FCHU/22 or ÚCHV/FCHU/21 or ÚCHV/FCHU/10	
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. Assessment. <p><p></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, ebullioscopy), adsorption. Experimental verification of theoretical knowledge on electrochemistry (conductivity, dissociation constants, activity coefficients, electromotive force of galvanic cell, Daniell cell, potentials, polarography) and chemical kinetics (determination of rate constants).	
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: 387

A	B	C	D	E	FX
75.45	19.64	4.13	0.52	0.26	0.0

Provides: RNDr. František Kaňavský, RNDr. Andrea Morovská Turoňová, PhD.

Date of last modification: 09.02.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: KPPaPZ/Ps/15		Course name: Psychology			
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: 2					
Recommended semester/trimester of the course: 1., 3., 5.					
Course level: I.					
Prerequisites:					
Conditions for course completion:					
Learning outcomes:					
Brief outline of the course:					
Recommended literature:					
Course language:					
Notes:					
Course assessment Total number of assessed students: 749					
A	B	C	D	E	FX
36.85	18.42	16.82	13.48	12.42	2.0
Provides: PhDr. Anna Janovská, PhD., Mgr. Ondrej Kalina, PhD.					
Date of last modification: 24.06.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

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

the connection of the curriculum with practice. Students will be expected to take an active approach in lectures and seminars with an emphasis on their independence and responsibility.					
Brief outline of the course: How to understand human behavior (overview of basic approaches in psychology); Basic overview of cognitive processes; Learning processes and their use in practice; Social influences, prosocial and antisocial behavior; How human emotions and motivations work; Deciding - why and when we take risks; Childhood experiences and their relationship to adulthood; Abnormal behavior, mental disorders and therapeutic approaches					
Recommended literature:					
Course language:					
Notes:					
Course assessment Total number of assessed students: 208					
A	B	C	D	E	FX
42.79	21.15	28.85	5.29	1.44	0.48
Provides: Mgr. Ondrej Kalina, PhD.					
Date of last modification: 24.06.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ KVM/15	Course name: Quantum Mechanics 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: 5	
Recommended semester/trimester of the course: 5.	
Course level: I.	
Prerequisites:	
Conditions for course completion: To successfully complete the course, the student must demonstrate sufficient understanding of the basics terms, concepts and applications of quantum physics. Knowledge of basic concepts is required from quantum physics at the level of their mathematical definition as well as their physical content and concrete applications. During the semester, the student must continuously master the content of the curriculum in order to gain the acquired knowledge, which he should actively and creatively use in solving specific tasks during exercises and complete continuous written tests taken into account in the overall evaluation of the subject. The condition for obtaining credits is passing 2 continuous written tests in exercises and an oral exam, which consists of one computational task and theoretical questions. The credit evaluation of the course takes into account the following student workload: direct teaching (2 credits), self-study (1 credit), individual consultations (1 credit) and assessment (1 credit). The minimum threshold for completing the course is to obtain at least 50% of the total score, using the following rating scale: A (90-100%), B (80-89%), C (70-79%), D (60-69%), E (50-59%), F (0-49%).	
Learning outcomes: After completing lectures and exercises, the student will have sufficient physical skills, knowledge and mathematical apparatus enabling independent solution of a wide range of traditional scientific problems in quantum physics. At the same time, he will gain an overview of the applications of quantum physics in various areas of physics such as nuclear physics, condensed matter physics, statistical physics, etc.	
Brief outline of the course: <ol style="list-style-type: none"> 1. Subject of study, experimental and theoretical foundations of quantum mechanics (QM). 2. Wave formulation of QM. Postulate about wave function, superposition principle and postulate about operators. 3. Eigenvalues and eigenfunctions of operators. Measurement of quantities and reduction of wave function. 4. Time-independent and time-dependent Schrödinger equation. Ehrenfest equations and integrals of motion. A continuity equation. 5. Matrix formulation of QM, Dirac symbolism, calculation of mean values and density matrix. 6. Current immeasurability of physical quantities, Heisenberg uncertainty relations. 	

7. Solution of the Schrödinger equation for a particle in an infinitely deep potential well and a particle in the finite potential well. Bound and scattering states.
8. Passage of a particle through a potential barrier: tunneling and barrier reflection.
9. Solution of Schrödinger equation for linear harmonic oscillator.
10. Particle motion in the central potential field, angular part of the Schrödinger equation.
11. Particle motion in the central potential field, radial part of the Schrödinger equation. Hydrogen atom.
12. Electron spin, Pauli matrix. Principle of indistinguishability of identical particles, fermions and bosons. Pauli's exclusion principle.

Recommended literature:

1. Ľ. Tóth, M. Tóthová, Kvantová a štatistická fyzika I, Rektorát Univerzity P. J. Šafárika, 1982. (in Slovak language)
2. Ľ. Skála, Úvod do kvantovej mechaniky, Academia, Praha, 2005. (in Czech language)
3. J. Pišút, L. Gomolčák, Úvod do kvantovej mechaniky, Bratislava 1983. (in Slovak language)
4. W. Greiner, Quantum Mechanics, 4th edition, Springer, Berlin, 2000.
5. A. C. Phillips, Introduction to Quantum Mechanics, Wiley, Weinheim, 2003.
6. D. J. Griffiths, Introduction to Quantum Mechanics, Prentice Hall, New Jersey, 1995.
7. G. Auletta, M. Fortunato, G. Parisi, Quantum Mechanics, Cambridge University Press, Cambridge, 2009.

Course language:

EN - english

Notes:

Course assessment

Total number of assessed students: 40

A	B	C	D	E	FX
22.5	20.0	25.0	15.0	7.5	10.0

Provides: doc. RNDr. Jozef Strečka, PhD.

Date of last modification: 19.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: KPE/ OLŠ/15		Course name: School Administration and Legislation			
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., 5.					
Course level: I.					
Prerequisites:					
Conditions for course completion:					
Learning outcomes:					
Brief outline of the course:					
Recommended literature:					
Course language:					
Notes:					
Course assessment Total number of assessed students: 285					
A	B	C	D	E	FX
45.61	29.82	14.39	6.32	3.16	0.7
Provides: PaedDr. Michal Novocký, PhD.					
Date of last modification: 20.06.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚTVŠ/ 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.	
Prerequisites:	
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. Posilování 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: 54

abs	n
11.11	88.89

Provides: Mgr. Agata Dorota Horbacz, PhD.

Date of last modification: 29.03.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: KF/VKFV/07		Course name: Selected Topics in Philosophy of Education (General Introduction)			
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., 5.					
Course level: I.					
Prerequisites:					
Conditions for course completion:					
Learning outcomes:					
Brief outline of the course:					
Recommended literature:					
Course language:					
Notes:					
Course assessment Total number of assessed students: 16					
A	B	C	D	E	FX
37.5	37.5	18.75	6.25	0.0	0.0
Provides: PhDr. Dušan Hruška, PhD.					
Date of last modification: 13.04.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

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.	
Prerequisites: (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: 494					
A	B	C	D	E	FX
28.14	25.91	25.3	12.96	5.47	2.23
Provides: doc. RNDr. Taťána Gondová, CSc.					
Date of last modification: 01.08.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

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

Course assessment					
Total number of assessed students: 157					
A	B	C	D	E	FX
60.51	21.02	11.46	4.46	1.27	1.27
Provides: Mgr. Ján Ruman, PhD.					
Date of last modification: 13.04.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: KGER/OJPV1/07	Course name: Specialised German Language - Natural Sciences 1
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.	
Prerequisites:	
Conditions for course completion: Active participation in class and completed homework assignments. Students are allowed to miss 2 classes at the most (2x90 min.). 1 control tests during the semester and written assignments. 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 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 effectively use the language for a given purpose, with focus on Academic English and English for specific/professional purposes - Natural Science , level B1.	
Brief outline of the course:	
Recommended literature: Duden Basiswissen Schule. Abitur: Enthält die Bände Mathematik, Physik, Chemie, Biologie, Geographie, Geschichte. (2007). ISBN: 978-3411002511. Zettl, E. et al.: Aus moderner Technik und Naturwissenschaft. Ismaning: Hueber, 2003. Reiss, K.: Basiswissen Zahlentheorie: Eine Einführung in Zahlen und Zahlbereiche (Mathematik für das Lehramt), Springer, 2007. ISBN: 978-3540453772. Meyer, L., Schmidt, G.- D.: Basiswissen Ausbildung: Physik. Bildungsverlag EINS, 2008. ISBN: 978-3427799337. Duden. Schülerduden Biologie: Das Fachlexikon von A-Z. Bibliographisches Institut Berlin, 2009. ISBN: 978-3411054275. Mortimer, Ch. E., Müller, U., Beck, J.: Chemie: Das Basiswissen der Chemie. Stuttgart: Thieme, 2014. ISBN: 978-313484311 Deutsch perfekt, GEO, MaxPlanck Forschung a iné printové a elektronické médiá	
Course language: German	
Notes:	

Course assessment					
Total number of assessed students: 147					
A	B	C	D	E	FX
24.49	23.13	23.81	20.41	7.48	0.68
Provides: Mgr. Blanka Jenčíková					
Date of last modification: 09.02.2023					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

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., I.II., II.	
Prerequisites:	
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: Within the optional subject, the Institute of Physical Education and Sports of Pavol Jozef Šafárik University provides for students the following sports activities: aerobics, aikido, basketball, badminton, body form, bouldering, floorball, yoga, power yoga, pilates, swimming, body-building, indoor football, S-M systems, step aerobics, table tennis, tennis, volleyball and chess. In the first two semesters of the first level of education students will master basic characteristics and particularities of individual sports, motor skills, game activities, they will improve level of their physical condition, coordination abilities, physical performance, and motor performance fitness. Last but not least, the important role of sports activities is to eliminate swimming illiteracy and by means of a special program of medical physical education to influence and mitigate unfitness. In addition to these sports, the Institute offers for those who are interested winter and summer physical education trainings with an attractive program and organises various competitions, either at the premises of the faculty or University or competitions with national or 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: 14548

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
86.46	0.07	0.0	0.0	0.0	0.05	8.41	5.02

Provides: Mgr. Agata Dorota Horbacz, PhD., Mgr. Dávid Kaško, PhD., Mgr. Zuzana Küchelová, PhD., doc. PaedDr. Ivan Uher, PhD., MPH, prof. RNDr. Stanislav Vokál, DrSc., Mgr. Marcel Čurgali, Mgr. Patrik Berta, Mgr. Ladislav Kručanica, PhD., Mgr. Richard Melichar, Mgr. Petra Tomková, PhD., MUDr. Peter Dombrovský

Date of last modification: 29.03.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

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., I.II., II.	
Prerequisites:	
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: Within the optional subject, the Institute of Physical Education and Sports of Pavol Jozef Šafárik University provides for students the following sports activities: aerobics, aikido, basketball, badminton, body form, bouldering, floorball, yoga, power yoga, pilates, swimming, body-building, indoor football, S-M systems, step aerobics, table tennis, tennis, volleyball and chess. In the first two semesters of the first level of education students will master basic characteristics and particularities of individual sports, motor skills, game activities, they will improve level of their physical condition, coordination abilities, physical performance, and motor performance fitness. Last but not least, the important role of sports activities is to eliminate swimming illiteracy and by means of a special program of medical physical education to influence and mitigate unfitness. In addition to these sports, the Institute offers for those who are interested winter and summer physical education trainings with an attractive program and organises various competitions, either at the premises of the faculty or University or competitions with national or international participation.	
Recommended literature: BENEC, 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:Trénink 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: 13211

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
84.35	0.51	0.02	0.0	0.0	0.05	10.78	4.29

Provides: Mgr. Agata Dorota Horbacz, PhD., Mgr. Dávid Kaško, PhD., Mgr. Zuzana Küchelová, PhD., doc. PaedDr. Ivan Uher, PhD., MPH, prof. RNDr. Stanislav Vokál, DrSc., Mgr. Marcel Čurgali, Mgr. Patrik Berta, Mgr. Ladislav Kručanica, PhD., Mgr. Richard Melichar, Mgr. Petra Tomková, PhD., MUDr. Peter Dombrovský

Date of last modification: 29.03.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

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., I.II., II.	
Prerequisites:	
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: Within the optional subject, the Institute of Physical Education and Sports of Pavol Jozef Šafárik University provides for students the following sports activities: aerobics, aikido, basketball, badminton, body form, bouldering, floorball, yoga, power yoga, pilates, swimming, body-building, indoor football, S-M systems, step aerobics, table tennis, tennis, volleyball and chess. In the first two semesters of the first level of education students will master basic characteristics and particularities of individual sports, motor skills, game activities, they will improve level of their physical condition, coordination abilities, physical performance, and motor performance fitness. Last but not least, the important role of sports activities is to eliminate swimming illiteracy and by means of a special program of medical physical education to influence and mitigate unfitness. In addition to these sports, the Institute offers for those who are interested winter and summer physical education trainings with an attractive program and organises various competitions, either at the premises of the faculty or University or competitions with national or 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: 8879

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
88.62	0.07	0.01	0.0	0.0	0.02	4.25	7.03

Provides: Mgr. Marcel Čurgali, Mgr. Agata Dorota Horbacz, PhD., Mgr. Dávid Kaško, PhD., Mgr. Zuzana Küchelová, PhD., doc. PaedDr. Ivan Uher, PhD., MPH, prof. RNDr. Stanislav Vokál, DrSc., Mgr. Patrik Berta, Mgr. Ladislav Kručanica, PhD., Mgr. Richard Melichar, Mgr. Petra Tomková, PhD., MUDr. Peter Dombrovský

Date of last modification: 29.03.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

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., I.II., II.	
Prerequisites:	
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: Within the optional subject, the Institute of Physical Education and Sports of Pavol Jozef Šafárik University provides for students the following sports activities: aerobics, aikido, basketball, badminton, body form, bouldering, floorball, yoga, power yoga, pilates, swimming, body-building, indoor football, S-M systems, step aerobics, table tennis, tennis, volleyball and chess. In the first two semesters of the first level of education students will master basic characteristics and particularities of individual sports, motor skills, game activities, they will improve level of their physical condition, coordination abilities, physical performance, and motor performance fitness. Last but not least, the important role of sports activities is to eliminate swimming illiteracy and by means of a special program of medical physical education to influence and mitigate unfitness. In addition to these sports, the Institute offers for those who are interested winter and summer physical education trainings with an attractive program and organises various competitions, either at the premises of the faculty or University or competitions with national or international participation.	
Recommended literature: BENEC, 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:Trénink 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: 5628

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
82.66	0.28	0.04	0.0	0.0	0.0	8.05	8.97

Provides: Mgr. Marcel Čurgali, Mgr. Agata Dorota Horbacz, PhD., Mgr. Dávid Kaško, PhD., Mgr. Zuzana Küchelová, PhD., doc. PaedDr. Ivan Uher, PhD., MPH, prof. RNDr. Stanislav Vokál, DrSc., Mgr. Patrik Berta, Mgr. Ladislav Kručanica, PhD., Mgr. Richard Melichar, Mgr. Petra Tomková, PhD., MUDr. Peter Dombrovský

Date of last modification: 29.03.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: ÚFV/STA1N/15		Course name: Statistical Physics			
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: 4					
Recommended semester/trimester of the course: 6.					
Course level: I.					
Prerequisites: ÚFV/KVM/08 or ÚFV/KVM/15					
Conditions for course completion:					
Learning outcomes:					
Brief outline of the course:					
Recommended literature:					
Course language: Slovak, English					
Notes:					
Course assessment Total number of assessed students: 37					
A	B	C	D	E	FX
37.84	29.73	16.22	8.11	8.11	0.0
Provides: prof. RNDr. Michal Jaščur, CSc., Mgr. Pavol Gajdoš, PhD.					
Date of last modification: 02.04.2020					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ SVL1/03	Course name: Structure and Properties of Solids
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.	
Prerequisites:	
Conditions for course completion: For successful completing of the subject student after taking exam shows adequate knowledge from area of structure and properties of solids, After completing the subject student is able to continue with the lectures from the specialized courses like Magnetism, Low Temperature Physics, Structural analysis, Superconductors etc. Credits evaluation takes into account taking part at the lectures - 2 credits, study of recommended literature -1 credit, exam - 2 credits. Minimal value to obtain evaluation is reach 50% of each evaluation (test and exam) points. Point ratio exam/test is 70/30. Evaluation scale is: A (90-100%), B (80-89%), C (70-79%), D (60-69%), E (50-59%), F (0-49%)	
Learning outcomes: After completing the lectures and taking the written test, the student will have a deep knowledge which allows her/him to find relationships between structure and physical properties of selected solids. Student is also able to continue with the lectures from the specialized courses like Magnetism, Low Temperature Physics, Structural analysis, Superconductors etc. metals and also will have the ability to enter into a systematic theoretical and experimental solution of the problems of condensed matter physics.	
Brief outline of the course: Time schedule of the subject contents is updated in electronic board in AiS2 sw. The subject content is focused in the following main topics: Periodic array of atoms. Fundamental type of lattices. Index systems for crystal planes. Simple crystal structure. Symmetry and crystal structure. Point and space groups. Crystal binding and elastic constants. Wave diffraction and the reciprocal lattice. X-ray diffractometry. Bragg's law, Laue conditions, scattering of x-rays, Neutrons and neutron scattering, CW - diffractometer, Ewald's sphere, Diffraction on powder samples, Structure factor, Occupation factor, Atomic displacement factor. Thermal properties. Phonon heat capacity, thermal conductivity. Free electron Fermi gas. Energy bands. Semiconductor crystals. Superconductivity.	
Recommended literature: 1. V. Valvoda: Základy krystalografie, SPN Praha, 1982 2. Z.T. Durski: Podstawy krystalografii strukturalnej i rentgenowskiej, PWN, 1994 3. V. Kavečanský: Fyzika tuhých látek, Košice 1983 4. CH. Kittel: Úvod do fyziky Pevných látek, Academia, Praha 1985. 5. W. D. Callister: Materials Science and Engineering, John Wiley and Sons, New York, 1994.	

6. Chetan Nayak, Solid State Physics, www.physics.ucla.edu/~nayak/solid_state.pdf
 7. Bernard Ruph, X-ray Crystallography, <http://www.ruppweb.org/Xray/101index.html>

Course language:

English

Notes:

Lectures can be done at presence form or online using MS Teams. 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: 53

A	B	C	D	E	FX
37.74	26.42	18.87	11.32	3.77	1.89

Provides: prof. RNDr. Pavol Sovák, CSc., RNDr. Jozef Bednarčík, PhD.

Date of last modification: 21.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/MUSU/21	Course name: Structure determination - spectroscopic methods
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 2 / 3 Per study period: 28 / 42 Course method: present	
Number of ECTS credits: 6	
Recommended semester/trimester of the course: 6.	
Course level: I.	
Prerequisites: ÚCHV/OCHU/21 and ÚCHV/ANCHU/21 and ÚCHV/ACHU/21	
Conditions for course completion: 1. Participation in exercises in accordance with the Study Rules of PF UPJŠ. 2. Successful execution of 3 control written works on exercises after 4., 8. and 12. weeks of teaching. Obtaining a minimum grade E from seminars. The 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. Percentage rating: 100-91% (A), 90-81% (B), 80-71% (C), 70-61% (D), 60-51% (E), 50% and less FX.	
Learning outcomes: 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 (¹ H NMR, ¹³ C 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. ¹ H NMR, ¹³ C NMR, NMR of other nuclei. Two- and more dimensional NMR. NMR applications. Nuclear quadrupolar resonance - NQR, Electron paramagnetic 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. 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, 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: 37

A	B	C	D	E	FX
13.51	43.24	29.73	10.81	2.7	0.0

Provides: doc. RNDr. Ján Imrich, CSc., RNDr. Monika Tvrdonová, PhD., doc. RNDr. Juraj Kuchár, PhD.

Date of last modification: 04.08.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ SVK/00	Course name: Students Scientific Conference (Presentation)
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., II.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 6	
abs	n
100.0	0.0
Provides:	
Date of last modification: 03.05.2015	
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.	

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.	
Prerequisites:	
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	

<ul style="list-style-type: none"> - collaborative interactive whiteboards (Jamboard, Whiteboard) - online presentations and online meetings (Google presentations, Powerpoint, Google meet, Microsoft teams)					
Recommended literature: <ol style="list-style-type: none"> 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: 81					
A	B	C	D	E	FX
45.68	3.7	7.41	0.0	43.21	0.0
Provides: doc. RNDr. Jozef Hanč, PhD.					
Date of last modification: 26.01.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

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.	
Prerequisites:	
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: 209	
abs	n
37.32	62.68
Provides: Mgr. Dávid Kaško, PhD.	
Date of last modification: 29.03.2022	
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ TMEU/15	Course name: Theoretical Mechanics
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: 3	
Recommended semester/trimester of the course: 3.	
Course level: I.	
Prerequisites: ÚFV/VF1a/12	
Conditions for course completion: To successfully complete the course, the student must demonstrate sufficient understanding of all basic concepts and applications of theoretical mechanics. Knowledge of basic concepts at the level of their mathematical definition is required, as well as their physical content and principled applications. The student must be able to actively master the content of the curriculum continuously during the semester, so that he can actively and creatively use the acquired knowledge in solving specific problems in exercises and independent homework. In addition to direct participation in teaching, the student is obliged to independently study professional topics assigned by the teacher and also to develop and present one home assignments. The condition for obtaining credits is, in addition to participation in teaching, also the successful completion of the two written tests from exercises and lectures and the elaboration of home assignments. The minimum limit for passing the exam is to obtain 51% of the total score, which takes into account all required activities with relevant weight. Rating scale: A - 91% - 100% points, B - 81% - 90% points, C - 71% - 80% points, D - 61% - 70% points, E - 51% - 60% points.	
Learning outcomes: The lecture on Theoretical Mechanics is the first lecture of an extensive university course in theoretical physics, where the student gets acquainted with fundamental theoretical concepts (e.g., generalized coordinates, velocities and momentum, phase space, Hamiltonian Lagrangian ...), which constitute the basis for understanding advanced theoretical methods of advanced courses such as quantum mechanics, statistical physics and quantum field theory. For this reason, attending this lecture is essential for all physics students. In addition to deep physical knowledge, students will also gain practical experience in solving complex problems of mechanics of systems of mass points and mechanics of a rigid body.	
Brief outline of the course: 1. Dynamics of a free system of mass points. 2. Motion of a constrained system of mass points. Constrains and their classification. The principle of virtual work and search for equilibrium positions. 3. D'Alembert's principle. Lagrange equations of the first kind. Generalized coordinates and generalized forces.	

4. Lagrange equations of the second kind and generalized potential.
5. Basic properties of Lagrange equations. First integrals of equations of motion: Integral of energy and generalized momentum.
6. Integral principles. Variation of functions and integrals. Hamilton's principle.
7. Hamilton's function. Hamilton's canonical equations.
8. Mechanics of a perfectly rigid body. Position of a rigid body in space, independent coordinates. The speed of the points of a rigid body.
9. Center of gravity, linear and angular momentums of a rigid body. Tensor of inertia. Euler angles and Euler kinematic equations.
10. Kinetic energy of a rigid body. Euler's equations of motion of a perfectly rigid body.

Recommended literature:

1. Meirovitch L.: Methods of Analytical dynamics, McGraw-Hill, New York, 1970.
2. Taylor T.T.: Mechanics: Classical and Quantum, Pergamon Press, Oxford, 1976.
3. Strelkov S.P.: Mechanics, Mir Publishers, Moscow, 1985.
4. Greiner W.: Classical Mechanics, Springer-Verlag, Berlin, 2010.
5. Goldstein H.: Classical Mechanics, Addison-Wesley, London, 1970.
6. Barger V., Olsson M.: Classical Mechanics: A Modern Perspective, McGraw-Hill, London, 1973.

Course language:

Slovak, English

Notes:

Course assessment

Total number of assessed students: 44

A	B	C	D	E	FX
52.27	6.82	9.09	20.45	4.55	6.82

Provides: prof. RNDr. Michal Jaščur, CSc.

Date of last modification: 20.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: KPE/TVE/08		Course name: Theory of Education			
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., 6.					
Course level: I.					
Prerequisites:					
Conditions for course completion:					
Learning outcomes:					
Brief outline of the course:					
Recommended literature:					
Course language:					
Notes:					
Course assessment Total number of assessed students: 631					
A	B	C	D	E	FX
43.11	31.22	16.8	5.07	1.74	2.06
Provides: Mgr. Katarína Petříková, PhD.					
Date of last modification: 20.06.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ TEP1/03	Course name: Theory of the Electromagnetic Field
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.	
Prerequisites: ÚFV/VFM1b/15 or ÚFV/VF1b/03	
Conditions for course completion: To successfully complete the course, the student must demonstrate sufficient understanding of the basics terms, concepts and applications of electromagnetic field theory. Knowledge of basic concepts is required at the level of their mathematical definition, as well as their physical content and specific applications. During the semester, the student must continuously master the content of the curriculum so that he can actively and creatively use the acquired knowledge in solving specific tasks during the exercises and pass continuous written tests taken into account in the overall evaluation of the subject. The condition for obtaining credits is passing 2 continuous written tests in exercises and an oral exam, which consists of theoretical questions covering the entire scope of the course. The credit evaluation of the course takes into account the following student workload: direct teaching (2 credits), self-study (1 credit), individual consultations (1 credit) and assessment (1 credit). The minimum threshold for completing the course is to obtain at least 50% of the total score, using the following rating scale: A (90-100%), B (80-89%), C (70-79%), D (60- 69%), E (50-59%), F (0-49%).	
Learning outcomes: After completing lectures and exercises, the student will have sufficient physical skills, knowledge and mathematical apparatus enabling independent solution of a wide range scientific problems in electromagnetic field theory. The student also gets an overview of applications of electromagnetic field theory in various fields of physics such as electricity, magnetism, optics, etc.	
Brief outline of the course: 1. Charge density and current density. Continuity equation. Definition of electromagnetic field. 2. System of Maxwell's equations in vacuum: differential formulation of Gauss' law of electrostatics, law of total current. The absence of magnetic monopoles and the law of electromagnetic induction. 3. Scalar and vector potential, gauge transformation. Wave equations for potentials. Energy conservation law in electromagnetic field theory: Poynting vector. 4. Conservation law of momentum of electromagnetic field: Maxwell's stress tensor. 5. Electrostatic field in vacuum and its potential. Potential of charges distributed in space and on surfaces. Boundary conditions on a charged area.	

6. Multipole development of charge system potential. Electrostatic field energy. Electrostatic potential energy of a charge system and its multipole development in an external electric field.
7. Dielectric polarization. Vector of electrical induction, dielectric susceptibility and permittivity. Electrostatic field induced by a system of free charges in a dielectric, boundary conditions at the interface of two dielectrics.
8. Magnetic fields of stationary currents in vacuum; Biot-Savart law.
9. Stationary magnetic field of closed elementary current system, magnetic moment. Magnetization of magnets, magnets in the magnetic field of stationary currents.
10. Magnetic field strength, magnetic susceptibility and permeability. Magnetic field of a system of conductive currents in magnetics, boundary conditions at the interface of two magnets.
11. System of Maxwell's equations in the material environment and the conservation law of electromagnetic field energy. Quasi-stationary electromagnetic field.
12. Electromagnetic waves in homogeneous non-conductive medium, plane electromagnetic wave. Monochromatic plane wave and its polarization.
13. Refraction and reflection of a plane monochromatic wave at the interface of two media.

Recommended literature:

Kvasnica J.: Teorie elektromagnetického pole. Academia Praha, 1985.
 Bobák A.: Teória elektromagnetického poľa, UPJŠ Košice, 2002.
 Bobák A., Vargová E.: Zbierka riešených úloh z elektromagnetického poľa, UPJŠ Košice, 2001.
 Greiner W.: Classical Electrodynamics, Springer-Verlag, New York, 1998.

Course language:

1. Slovak,
2. English

Notes:

Course assessment

Total number of assessed students: 330

A	B	C	D	E	FX
26.97	8.79	18.18	21.21	16.67	8.18

Provides: doc. RNDr. Jozef Strečka, PhD., RNDr. Marek Semjan

Date of last modification: 19.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., prof. RNDr. Vladimír Zelenák, DrSc.