

# CONTENT

1. Academic English.....	4
2. Alternative Education.....	6
3. Applied Electronics.....	7
4. Bachelor Project.....	9
5. Bachelor Project.....	11
6. Bachelor State Exam Physics.....	12
7. Bachelor Thesis Project Seminar 1.....	13
8. Bachelor Thesis Project Seminar 2.....	14
9. Bachelor Thesis and its Defence.....	15
10. Bachelor Thesis and its Defence.....	16
11. Basics of Karstology and Speleology.....	17
12. Biology of Children and Adolescents.....	18
13. Cartography and Geoinformatics 1.....	19
14. Cartography and Geoinformatics 2.....	22
15. Communication.....	23
16. Communicative Competence in English.....	25
17. Communicative Grammar in English.....	27
18. Communicative Grammar in German Language.....	29
19. Computer-Based Physical Measurement.....	31
20. Conflict Management.....	33
21. Cultural Geography.....	35
22. Digital technologies in geography.....	36
23. Drug Addiction Prevention in University Students.....	38
24. Economic geography.....	40
25. Educational software.....	41
26. Electronics Practical.....	43
27. Electronics.....	45
28. English Language of Natural Science.....	47
29. Environmental Geology.....	49
30. Fieldwork in Hydrology.....	50
31. Fundamentals of Geology for Geographers.....	51
32. Fundamentals of Mathematics for Physicists 2.....	52
33. Fundamentals of Mathematics for Physicists 2.....	54
34. Fundamentals of Mathematics for Physicists I.....	56
35. General Biophysics I.....	58
36. General Physics I.....	61
37. General Physics II.....	63
38. General Physics III.....	65
39. General Physics IV.....	67
40. Geographic Information Systems.....	69
41. Geography.....	71
42. Geography of Religion.....	72
43. Geography of agriculture and industry.....	73
44. Geography of mining.....	74
45. Geography of services and tourism.....	75
46. Geography of the Czech Republic.....	76
47. Geography of the atmosphere and hydrosphere.....	77
48. Geography of the pedosphere and biosphere.....	78

49. Geoinformatics seminar.....	79
50. Geological excursion.....	80
51. Geomorphological mapping.....	81
52. Geomorphology.....	82
53. Getting to know the Student in Education.....	83
54. Human Geography Excursion.....	84
55. Human Geography of Slovakia.....	85
56. Inclusive Pedagogy.....	86
57. Integration and Inclusion in School Practice.....	87
58. International Excursion 1.....	88
59. Introduction to General Physics.....	89
60. Introduction to General Physics II.....	91
61. Introduction to Microworld Physics.....	93
62. Introduction to Study of Sciences.....	95
63. Introduction to the didactics of geography.....	96
64. Linux and open source GIS.....	97
65. Mathematics I for physicists.....	98
66. Mathematics II for physicists.....	100
67. Mentoring and Coaching in School Practice.....	102
68. Metageography and planetary geography.....	103
69. Methods of Data Processing in Physics.....	104
70. Methods of Physical Problems Solving.....	106
71. Methods of human geographical research.....	108
72. Methods of physical geographical research.....	109
73. Methods of thematic cartography.....	110
74. Microgeography.....	112
75. Mineral Resources - geological and environmental relations.....	113
76. Modern Trends in Physics.....	114
77. Multiculturalism and Multicultural Education.....	116
78. Pedagogy.....	117
79. Physical Geography Excursion.....	118
80. Physical Geography of Slovakia.....	119
81. Physics Practical I.....	120
82. Physics Practical II.....	122
83. Physics Practical III.....	124
84. Physics Practical IV.....	126
85. Physics in Demonstration Experiments.....	128
86. Political geography.....	129
87. Population Geography.....	130
88. Positive Psychology.....	131
89. Psychology.....	133
90. Psychology of Everyday Life.....	134
91. Quantum Mechanics I.....	136
92. Regional Geography of Europe.....	138
93. Remote sensing applications.....	139
94. School Administration and Legislation.....	140
95. Selected Topics in Philosophy of Education (General Introduction).....	141
96. Self-Marketing.....	142
97. Seminar of human geography.....	144

98. Seminar of physical geography.....	145
99. Social and Political Context of Education.....	146
100. Special Theory of Relativity.....	148
101. Sports Activities I.....	149
102. Sports Activities II.....	151
103. Sports Activities III.....	153
104. Sports Activities IV.....	155
105. Statistical Methods in Geography.....	157
106. Structure and Properties of Solids.....	158
107. Student Scientific Conference.....	160
108. Student Scientific Conference in Geography.....	161
109. Students` Digital Literacy.....	162
110. Summer Course-Rafting of TISA River.....	164
111. Teachers` Support Groups.....	166
112. Team Work.....	167
113. Theoretical Mechanics.....	168
114. Theory of Education.....	170
115. Theory of the Electromagnetic Field.....	171
116. Thermodynamics and Statistical physics.....	173

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> CJP/ PFAJAKA/07	<b>Course name:</b> Academic English
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week: 2 Per study period: 28</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b>	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Active classroom participation, assignments handed in on time, 2 absences tolerated 1 test (13th week), no retake. Presentation on chosen topic Final evaluation- average assessment of test (50%), and presentation (50%). Grading scale: A 93-100%, B 86-92%, C 79-85%, D 72-78%, E 65-71%, FX 64% and less	
<b>Learning outcomes:</b> 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.	
<b>Brief outline of the course:</b> 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	
<b>Recommended literature:</b> 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	

<b>Course language:</b> English language, level B2 according to CEFR.					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 436					
A	B	C	D	E	FX
36.24	22.25	14.91	9.86	5.73	11.01
<b>Provides:</b> Mgr. Viktória Mária Slovenská					
<b>Date of last modification:</b> 17.09.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KPE/ ALP/06		<b>Course name:</b> Alternative Education			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 4.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 400					
A	B	C	D	E	FX
64.25	25.0	6.5	2.0	0.25	2.0
<b>Provides:</b> Mgr. Zuzana Vagaská, PhD.					
<b>Date of last modification:</b> 22.09.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ EP/22	<b>Course name:</b> Applied Electronics
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 5.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> For successful take part of the subject, the student must demonstrate understanding of physical phenomena which are necessary for description of selected classical electronic elements and systems together with their technological implementation. The analysis of the properties and functions of these elements, electronic circuits, information transmission and processing systems are required. Student needs to become familiar with basic elements and components in Nanoelectronics, explain the methods of their production and principles of operation. This knowledge is needed for understanding basic concepts of modern electronics and its applications. The student must acquire the content of the subject during the semester and acquired knowledge can be active and creatively used in understanding the electronic circuits. Condition to obtain credits is the completion of the final test. Credit assessment of the subject takes into account the following student burden: participation in exercises (1 credit) and elaboration of 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%).	
<b>Learning outcomes:</b> Student will have sufficient physical knowledge to allow solutions and analysis of electronic circuits after completing the practice. At the same time, they will have an overview of modern electronic technologies on the nano-level scale.	
<b>Brief outline of the course:</b> 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	
<b>Recommended literature:</b> 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					
<b>Course language:</b> 1.Slovak 2. English					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 24					
A	B	C	D	E	FX
79.17	20.83	0.0	0.0	0.0	0.0
<b>Provides:</b> RNDr. Vladimír Tkáč, PhD.					
<b>Date of last modification:</b> 12.05.2022					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ BKP1/22	<b>Course name:</b> Bachelor Project
<b>Course type, scope and the method:</b> <b>Course type:</b> <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 5.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Submission of the bachelor project structure based on the assignments of the supervisor and acceptance of its content by the supervisor.	
<b>Learning outcomes:</b> The design of the bachelor's project structure for the elaboration of a bachelor's thesis, in which the student demonstrates that he is able to define, update the topic and structure of the bachelor's project, can study, process and correctly cite selected bibliographic resources, has an idea of formal and graphic aspects of the thesis.	
<b>Brief outline of the course:</b> The bachelor project is focused on a selected area of physics. Based on the goals of the bachelor's project, the student implements the first (preparatory phase) of the bachelor's thesis based on the following activities: clearly defines the topic, studies and updates bibliographic resources, creates a project structure in which formulates the working hypothesis, problem solving methods, works on the specified problem, prepares citations of bibliographic resources	
<b>Recommended literature:</b> 1. Resources (literature, papers) based on the project assignments. 2. Regulations No. 1/2011 about final works (thesis for University of P.J. Safarik.	
<b>Course language:</b> Slovak, English	
<b>Notes:</b>	
<b>Course assessment</b> Total number of assessed students: 12	
abs	n
100.0	0.0
<b>Provides:</b> doc. RNDr. Zuzana Ješková, PhD.	
<b>Date of last modification:</b> 31.01.2022	

**Approved:** doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ BKP2/14	<b>Course name:</b> Bachelor Project
<b>Course type, scope and the method:</b> <b>Course type:</b> <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 4	
<b>Recommended semester/trimester of the course:</b> 6.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Finalization and submission of the bachelor project based on the assignments of the supervisor and acceptance of its content by the supervisor.	
<b>Learning outcomes:</b> 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.	
<b>Brief outline of the course:</b> 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.	
<b>Recommended literature:</b> 1. Resources (literature, papers) based on the project assignments. 2. Regulations No. 1/2011 about final works (thesis for University of P.J. Safarik.	
<b>Course language:</b> Slovak, English	
<b>Notes:</b>	
<b>Course assessment</b> Total number of assessed students: 24	
abs	n
100.0	0.0
<b>Provides:</b> doc. RNDr. Zuzana Ješková, PhD.	
<b>Date of last modification:</b> 31.01.2022	
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.	

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚFV/ BSSM/22		<b>Course name:</b> Bachelor State Exam Physics			
<b>Course type, scope and the method:</b> <b>Course type:</b> <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b>					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> Answering questions concerning selected fields of the subjects of Bachelor state exam.					
<b>Learning outcomes:</b> Student has basic knowledge and overview of knowledge in the fields stated by the Bachelor state exam in line with the graduate profile.					
<b>Brief outline of the course:</b> Exam in the field of knowledge in physics consisting of an overview of the following fields: <ul style="list-style-type: none"> <li>- Mechanics and molecular physics</li> <li>- Electricity and magnetism</li> <li>- Oscillations and waves, optics</li> <li>- Nuclear physics</li> <li>- General biophysics</li> <li>- Theoretical mechanics</li> <li>- Theory of electromagnetic field</li> <li>- Statistical physics</li> </ul>					
<b>Recommended literature:</b>					
<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 22					
A	B	C	D	E	FX
36.36	18.18	27.27	13.64	4.55	0.0
<b>Provides:</b>					
<b>Date of last modification:</b> 14.03.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/SPB1/21		<b>Course name:</b> Bachelor Thesis Project Seminar 1			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 3					
<b>Recommended semester/trimester of the course:</b> 5.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 54					
A	B	C	D	E	FX
88.89	7.41	3.7	0.0	0.0	0.0
<b>Provides:</b> prof. Mgr. Jaroslav Hofierka, PhD., doc. Mgr. Ladislav Novotný, PhD.					
<b>Date of last modification:</b> 27.06.2022					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/SPB2/21		<b>Course name:</b> Bachelor Thesis Project Seminar 2			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 3					
<b>Recommended semester/trimester of the course:</b> 6.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 52					
A	B	C	D	E	FX
78.85	17.31	3.85	0.0	0.0	0.0
<b>Provides:</b> prof. Mgr. Jaroslav Hofierka, PhD., Mgr. Katarína Onáčillová, PhD.					
<b>Date of last modification:</b> 27.06.2022					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚFV/ BPO/14		<b>Course name:</b> Bachelor Thesis and its Defence			
<b>Course type, scope and the method:</b> <b>Course type:</b> <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b>					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> Required number of credits gained based on submitting the bachelor thesis.					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b> Oral presentation of the bachelor's thesis results before the examination committee. Answering questions from the supervisor and members of the examination committee regarding the topic of the bachelor's thesis.					
<b>Recommended literature:</b>					
<b>Course language:</b> Slovak or English					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 87					
A	B	C	D	E	FX
85.06	8.05	4.6	2.3	0.0	0.0
<b>Provides:</b>					
<b>Date of last modification:</b> 17.03.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/ BPO/14		<b>Course name:</b> Bachelor Thesis and its Defence			
<b>Course type, scope and the method:</b> <b>Course type:</b> <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b>					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 226					
A	B	C	D	E	FX
37.61	26.99	18.14	8.41	7.52	1.33
<b>Provides:</b>					
<b>Date of last modification:</b> 07.12.2021					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/ ZKAR/21		<b>Course name:</b> Basics of Karstology and Speleology			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 1 / 1 <b>Per study period:</b> 14 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 3					
<b>Recommended semester/trimester of the course:</b> 4.					
<b>Course level:</b> I., II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 27					
A	B	C	D	E	FX
55.56	22.22	7.41	11.11	3.7	0.0
<b>Provides:</b> RNDr. Alena Gessert, PhD., univerzitná docentka, doc. Ing. Katarína Bónová, PhD.					
<b>Date of last modification:</b> 09.09.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚBEV/ BDD/05		<b>Course name:</b> Biology of Children and Adolescents			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 0 <b>Per study period:</b> 28 / 0 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 4., 6.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> Written test					
<b>Learning outcomes:</b> Acquisition of basic morphological and physiological knowledge about individual organs and systems of the human body with a focus on the specifics of childhood and adolescence. Familiarity with developmental and growth characteristics and with the most common diseases in these stages of ontogenesis.					
<b>Brief outline of the course:</b> Human ontogenesis. Postnatal development. Age specific features of skeletal and muscular, circulatory, respiratory, gastrointestinal and urinary systems. Reproductive system. Endocrine system. Nervous system. Age specifics of selected diseases and drug dependence arise. Human population and environment.					
<b>Recommended literature:</b> Drobný I., Drobná M.: Biológia dieťaťa pre špeciálnych pedagógov I. a II. Bratislava, PdF UK, 2000 Lipková V.: Somatický a fyziologický vývoj dieťaťa. Osveta Bratislava, 1980 Malá H., Klementa J.: Biológia detí a dorastu. Bratislava, SPN, 1989					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 1830					
A	B	C	D	E	FX
31.04	24.26	18.63	16.45	9.02	0.6
<b>Provides:</b> doc. RNDr. Monika Kassayová, CSc.					
<b>Date of last modification:</b> 20.04.2022					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚGE/ KRT1/21	<b>Course name:</b> Cartography and Geoinformatics 1
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 2 <b>Per study period:</b> 28 / 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 5	
<b>Recommended semester/trimester of the course:</b> 1.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> During the semester, it is necessary to submit the results of the exercises. The acquired knowledge at the exercises will be verified by continuous examinations. The number of work outputs and written examinations will be announced at the beginning of the semester. It is possible to obtain 30% for meeting the evaluation criteria at the exercise (work outputs and written tests). The final evaluation of the exercises is determined by the instructor of the subject on the basis of completing the tasks in the exercises during the semester. The final evaluation of the course is based on a combination of meeting the evaluation conditions from the exercises and the final exam. A student who has met the conditions for passing the course at the seminars can apply for the final exam. The final evaluation is a weighted average of the evaluation from the exercises (30%) and the final exam (70%). Credits will be awarded only to a student who achieves the final grade at least at the level of grade E. Credits will not be awarded to a student who does not meet the requirements of the exercises and the final exam is evaluated by FX. Rating scale: A (100-91%), B (81-90%), C (71-80%), D (61-70%), E (51-60%).	
<b>Learning outcomes:</b> <b>Knowledge:</b> The student will gain theoretical knowledge in the field of cartography and geoinformatics. The student is able to understand cartographic and geoinformatics terminology, appropriately applies cartographic methods for displaying spatial information using a geographic information system, acquires a theoretical basis for the application of cartographic representations and coordinate systems and defines the composition of maps in GIS. The student acquires knowledge of the mathematical principles of mapping the Earth on a map and understands cartographic distortions, classification of cartographic representations, simple and false representations. The student acquires knowledge from the Slovak state map work (civil, military) and also acquires knowledge in cartographic expression methods (cartogram, cartodiagram) and the basics of cartometry. <b>Skills:</b> The student will learn to acquire and work with the basics of the QGIS program, its control, purpose and structure. The student acquires basic orientations and work in the QGIS program, and work in the basic tools, setting layer properties and is capable of exporting data in different formats. The student understands cartographic representations in QGIS. The student acquires skills in working with paper maps, scale and measurements on maps, can orient in the field using a map, compass and can determine the azimuth. The student has skills in creating a point layer, has skills in	

the principles of expressing point phenomena, the creation of a line layer as well as in the principles of expressing line phenomena, isolines. Student also has skills in creating a surface layer, in the principles of expressing surface phenomena. Controls the creation of map output, page settings, map export and output parameters settings. The student has skills in the composition of the map - setting the compositional elements of the map and in creating the map output.

Competences: The student is able to work with a high degree of independence with geodata, to visualize them and create new layers, has all the prerequisites for independent creation of digital map output with available software support within GIS. The student is fully competent in the composition of the map - setting its compositional elements. When creating a map output, the student is able to independently or in cooperation in the relevant work team to communicate and collaborate with other experts, formulate opinions and recommendations in the creation and use of GIS in cartography.

### **Brief outline of the course:**

Lectures: Cartography, basic concepts and position in the geosciences system. History and development of cartography. Geoinformatization cartography, digital cartography. Cartography and geoinformatics and their correlation. Geoinformatics, basic terms and definitions of GIS; online maps. Digital representation of objects and phenomena in GIS, vector and raster format. Principles of methodologies of cartographic modeling of geographical information in GIS. Design, use and evaluation of cartographic imaging properties in geoinformatics applications. Map - definition, map criteria, basic properties and elements of the map, categorization of maps, map scale. Principles of mapping the Earth, geoid, reference and display areas, global and local coordinate systems, the Earth and geographical lines and their importance for cartography and geoinformatics. Cartographic distortions, classification of cartographic representations, simple (azimuthal, conical, cylindrical) and false representations. Cartographic representations used in the Slovak state map work. Slovak state map work (civil, military), ZB-GIS, samples. Workflow for creating topographic maps, mapping, overview of 3D data collection in the field and used instrumentation. Map creation - basics of map language, cartographic characters, map markers - point, line and area phenomena. Cartographic expression methods - cartogram, cartodiagram, classification and types of cartograms and cartodiagrams. Map composition, map content, map colors, map description, geographical nomenclature, map design. Basics of cartometry - positioning, measuring and determining distances, measuring and determining the size of surfaces, measuring oriented directions and angles, determining altitudes, determining the slope, profile construction, hypsometric curve. Classification of field formations. Thematic maps of various scales, applications, interpretation of maps. Maps on the Internet, map servers, Google Maps / Earth, Openstreetmaps. Office of Geodesy, Cartography and Cathars of the Slovak Republic - Geoportal.

Exercises: Basic introduction to ArcGIS, its purpose and control, program structure, data formats (\*.mxd, \*.shp), basic terminology - project, data layer - point, line, area, "features" and "graphics". Basic orientation in ArcMap, introduction of basic tools of the "Standard" and "Tools" packages, window "Table of contents", arrangement and properties of layers, tool "Select features" and "Data - Export Data". Defining a coordinate system, cartographic representations in ArcGIS. Introducing the options of the "Layer Properties" dialog box, working with the attribute table, working with files. Basic table editing, preparation and connection of databases (excel / shapefile) using the "Join" function. Working with paper maps, scale and measurement on maps. Orientation in the field using a map, compass, azimuth determination. Georeferencing. Point layer formation; principles of expressing point phenomena in ArcGIS. Linear layer formation; principles of expressing linear phenomena in ArcGIS, isolines. Merge lines, Split lines. Formation; principles of expressing surface phenomena in ArcGIS, Polygon, Auto Complete Polygon, Cut Polygon Tools, Merge polygons. Cartogram, cartodiagram. Map output creation - Layout view, page settings, Map export and output

parameters settings. Map composition - setting the map composition elements and creating map output.					
<b>Recommended literature:</b> HOFIERKA, J., J. KAŇUK, M. GALLAY, 2014. Geoinformatika. Košice: Univerzita Pavla Jozefa Šafárika v Košiciach. ISBN 978-80-8152-178-2. HOJOVEC, V. et al., 1987. Kartografie. Praha: Geodetický a kartografický podnik v Praze. ISBN 29-621-87. LONGLEY, P.A., M. GOODCHILD, D. J. MAGUIRE, D. W. RHIND, 2010. Geographic Information Systems and Science. 3rd ed. Hoboken: Wiley & Sons, ISBN 978-0-470-72144-5. PRAVDA, J., D. KUSENDOVÁ, 2004. Počítačová tvorba tematických máp. Bratislava: Univerzita Komenského v Bratislave. ISBN 80-223-2011-0. ROBINSON, A. H. et al., 1995. Elements of Cartography. 6th ed. Hoboken: Wiley & Sons. ISBN 0-471-55579-7. VOŽENÍLEK, V. et al., 2011. Metody tematické kartografie - Vizualizace prostorových jevů. Olomouc: Univerzita Palackého v Olomouci. ISBN 978-80-24427-90-4.					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 172					
A	B	C	D	E	FX
12.79	15.12	29.07	27.33	15.12	0.58
<b>Provides:</b> Mgr. Michaela Nováková, PhD., prof. Mgr. Jaroslav Hofierka, PhD., Mgr. Loránt Pregi, PhD., Mgr. Jozef Šupinský, PhD.					
<b>Date of last modification:</b> 19.09.2023					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/KRT2/21		<b>Course name:</b> Cartography and Geoinformatics 2			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 2.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 88					
A	B	C	D	E	FX
59.09	23.86	10.23	4.55	0.0	2.27
<b>Provides:</b> Mgr. Ján Šašák, PhD., Mgr. Petra Dávidová					
<b>Date of last modification:</b> 27.06.2022					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

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

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

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

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

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

**Course language:**

slovak

**Notes:**

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**Course assessment**

Total number of assessed students: 60

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

**Provides:** PhDr. Anna Janovská, PhD., Mgr. Lucia Barbierik, PhD.

**Date of last modification:** 04.02.2025

**Approved:** doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> CJP/ PFAJKKA/07		<b>Course name:</b> Communicative Competence in English			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b>					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> Active participation in class and completed homework assignments. Students are allowed to miss two classes at the most. 2 credit tests (presumably in weeks 6/7 and 12/13) and an oral presentation in English. Final evaluation consists of the scores obtained for the 2 tests (50%). Final grade will be calculated as follows: A 93-100 %, B 86-92%, C 79-85%, D 72-78%, E 65-71%, FX 64 % and less.					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b> <a href="http://www.bbclearningenglish.com">www.bbclearningenglish.com</a> Štěpánek, Libor a kol. Academic English-Akademická angličtina. Praha: Grada Publishing, a.s., 2011. McCarthy M., O'Dell F.: English Vocabulary in Use, Upper-Intermediate. CUP, 1994. Fictumova J., Ceccarelli J., Long T.: Angličtina, konverzace pro pokročilé. Barrister and Principal, 2008. Peters S., Gráf T.: Time to practise. Polyglot, 2007. Jones L.: Communicative Grammar Practice. CUP, 1985. Additional study materials.					
<b>Course language:</b> English language, B2-C1 level according to CEFR					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 329					
A	B	C	D	E	FX
43.47	21.88	16.41	7.6	6.38	4.26
<b>Provides:</b> Mgr. Barbara Mitříková, Mgr. Viktória Mária Slovenská					

<b>Date of last modification:</b> 06.02.2025
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> CJP/ PFAJGA/07	<b>Course name:</b> Communicative Grammar in English
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week: 2 Per study period: 28</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b>	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Active classroom participation (maximum 2 absences tolerated), homework assignments completed by given deadlines. Presentation of a topic related to the study field. Final Test - end of semester, no retake Final assessment = average of test and presentation. Grading scale: A 93-100%, B 86-92%, C 79-85%, D 72-78%, E 65-71%, FX 64% and less	
<b>Learning outcomes:</b> 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.	
<b>Brief outline of the course:</b> 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	
<b>Recommended literature:</b> Vince M.: Macmillan Grammar in Context, Macmillan, 2008 McCarthy, O'Dell: English Vocabulary in Use, CUP, 1994 <a href="http://www.linguahouse.com">www.linguahouse.com</a> <a href="http://esllibrary.com">esllibrary.com</a> <a href="http://bbclearningenglish.com">bbclearningenglish.com</a> <a href="http://ted.com/talks">ted.com/talks</a>	
<b>Course language:</b>	

English language, level B2 according to CEFR.					
<b>Notes:</b>					
<b>Course assessment</b>					
Total number of assessed students: 447					
A	B	C	D	E	FX
41.39	19.69	15.66	7.83	5.59	9.84
<b>Provides:</b> Mgr. Viktória Mária Slovenská, Mgr. Lýdia Markovičová, PhD.					
<b>Date of last modification:</b> 08.02.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> KGER/ NJKG/07	<b>Course name:</b> Communicative Grammar in German Language
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b>	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Active participation in class and completed homework assignments. Students are allowed to miss 2 classes at the most (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.	
<b>Learning outcomes:</b> 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.	
<b>Brief outline of the course:</b> 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.	
<b>Recommended literature:</b> 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.	

Dintera,H./Steinmetz, M: Deutsch für Ingenieure. Ilmenau 2018.					
<b>Course language:</b> German, Slovak language					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 58					
A	B	C	D	E	FX
62.07	10.34	8.62	3.45	8.62	6.9
<b>Provides:</b> Mgr. Ulrika Strömplová, PhD.					
<b>Date of last modification:</b> 16.09.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ PPFM/15	<b>Course name:</b> Computer-Based Physical Measurement
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 4.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> 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	
<b>Learning outcomes:</b> 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.	
<b>Brief outline of the course:</b> 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"> <li>1. Motion in the Earth's homogenous gravitational field</li> <li>2. Bungee jumper</li> <li>3. Ideal gas behaviour</li> <li>4. Molar mass of gas</li> <li>5. Thermal expansion of water</li> <li>6. Electrical resistance and temperature</li> <li>7. Ohm's law for closed electric circuit</li> <li>8. Bulbs' behaviour in dc electric circuit</li> <li>9. Planck constant</li> <li>10. Transient phenomena in RC and RL circuit</li> <li>11. Alternating current electric circuit</li> <li>12. Forced oscillations and resonance</li> </ol>	

<b>Recommended literature:</b> CUMMINGS, Karen, LAWS, Priscilla, REDISH, Edward, COONEY, Patrick: Understanding Physics, John Wiley & Sons, 2004					
<b>Course language:</b> English					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 57					
A	B	C	D	E	FX
73.68	12.28	14.04	0.0	0.0	0.0
<b>Provides:</b> doc. RNDr. Zuzana Ješková, PhD.					
<b>Date of last modification:</b> 15.09.2021					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					



## COURSE INFORMATION LETTER

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

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

**Brief outline of the course:**

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

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**

Total number of assessed students: 0

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

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

**Date of last modification:** 12.09.2025

**Approved:** doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/ KULG/21		<b>Course name:</b> Cultural Geography			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b> 5.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 54					
A	B	C	D	E	FX
57.41	20.37	20.37	1.85	0.0	0.0
<b>Provides:</b> Mgr. Marián Kulla, PhD., prof. Mgr. Jaroslav Hofierka, PhD., Mgr. Max Timothy Martin					
<b>Date of last modification:</b> 27.06.2022					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚGE/ DTG/21	<b>Course name:</b> Digital technologies in geography
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 1.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Assessment is based on a combination of midterm (30%) and final assessment (70%) at the end of the semester. The overall evaluation is calculated as a weighted average of the final and midterm evaluation. The evaluation scheme applies to the overall evaluation: A (100-90 points), B (80-89 points), C (70-79 points), D (60-69 points), E (50-59 points), FX (0 -49 points).	
<b>Learning outcomes:</b> Knowledge: The student will gain knowledge in the field of information and communication technologies specific to the study of geography and geoinformatics. The student will learn to search for and sort different types of information. The acquired knowledge will be used in working with professional literature published in scientific databases and selected geospatial databases. Skills: The student will learn to work with selected WebGIS portals publishing geodata and use databases of scientific journals and citation manager. They will learn the basic methods of modifying different types of data in order to prepare them for integration into GIS. They will get acquainted with the license conditions of the used software within the department. Gain advanced knowledge of using Office. Competences: The student will acquire basic competencies in the field of ICT needed for the study of geography. The result is the student's ability to manage the study fluently and smoothly in terms of ICT literacy. The student is able to independently use ICT tools.	
<b>Brief outline of the course:</b> Important and useful information regarding the study, standards and services provided by the university for students (WiFi, information retrieval, websites, citation manager - CitacePro) operating systems, data types, file types, software used. Work with statistical data, DataCube, SO SR, Soil portal, ŠGÚDŠ, Geoenviroportal, Geoportal and similar web applications. Explanation of the essence of vector and raster graphics, graphic formats and their use. Work with spreadsheet and databases (formulas, contingency tables and graphs), advanced work and formatting in MS Word. Using MS PowerPoint to create presentations and posters.	
<b>Recommended literature:</b> KAŇUK, J., 2015. Priestorové analýzy a modelovanie. Vysokoškolské učebné texty. Prírodovedecká fakulta Univerzity Pavla Jozefa Šafárika v Košiciach. 114 s.	

ŽITNIAK, J., 2017. Microsoft Office 2016. Podrobná uživatelská příručka. Computer Press. 464 s.  
 KLATKOVSKÝ, K., 2016. Word 2016 nejen pro školy. Computer Media. 124 s.  
 KLATKOVSKÝ, K., 2016. Powerpoint 2016 nejen pro školy. Computer Media. 80 s.  
 LAURENČÍK, M., 2019. Excel 2016 a 2019 - pokročilé nástroje, Grada, 256 s.

**Course language:**

**Notes:**

**Course assessment**

Total number of assessed students: 175

A	B	C	D	E	FX
57.71	24.57	11.43	3.43	1.14	1.71

**Provides:** Mgr. Petra Dávidová

**Date of last modification:** 27.06.2022

**Approved:** doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.

## COURSE INFORMATION LETTER

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

<b>Course assessment</b>					
Total number of assessed students: 669					
A	B	C	D	E	FX
79.52	14.8	3.89	1.35	0.15	0.3
<b>Provides:</b> prof. PhDr. Ol'ga Orosová, CSc., PhDr. Janka Liptáková, PhD., Mgr. Zuzana Michalove					
<b>Date of last modification:</b> 24.06.2022					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/ EKG/21		<b>Course name:</b> Economic geography			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 / 1 <b>Per study period:</b> 42 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 6					
<b>Recommended semester/trimester of the course:</b> 3.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 113					
A	B	C	D	E	FX
12.39	12.39	22.12	23.01	26.55	3.54
<b>Provides:</b> Mgr. Marián Kulla, PhD., doc. Mgr. Ladislav Novotný, PhD., Mgr. Nikola Svetozarov					
<b>Date of last modification:</b> 27.06.2022					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					



## COURSE INFORMATION LETTER

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

10. Online educational platforms, repositories, projects and competitions. 11. Simulations and modelling. Subject-focused educational programmes. 12. Use digital tools to plan, monitor, differentiate and personalise learning. Accessibility of digital tools and learning resources.					
<b>Recommended literature:</b> SOLOMON, Gwen and Lynne SCHRUM, 2014. Web 2.0 How-to for Educators. Second. International Society for Technology in Education, 314 p. ISBN 978-1564843517. STOBAUGH, Rebecca, 2019. Fifty Strategies to Boost Cognitive Engagement: Creating a Thinking Culture in the Classroom (50 Teaching Strategies to Support Cognitive Development). Solution Tree Press, 176 p. ISBN 978-1947604773. LEMOV, Doug, 2015. Teach Like a Champion 2. 0: 62 Techniques That Put Students on the Path to College [online]. 2nd edition. John Wiley & Sons, Incorporated, 509 p. [cited 2021-7-10]. ISBN 9781118898628. Available from: <a href="https://ebookcentral.proquest.com/lib/upjs-ebooks/detail.action?docID=1895720">https://ebookcentral.proquest.com/lib/upjs-ebooks/detail.action?docID=1895720</a> European Schoolnet: Transforming education in Europe [online]. [cited 2021-7-10]. Available from: <a href="http://www.eun.org/home">http://www.eun.org/home</a> Science On Stage Europe [online]. Science on Stage Europe e.V. [cited 2021-7-10]. Available from: <a href="https://www.science-on-stage.eu/">https://www.science-on-stage.eu/</a>					
<b>Course language:</b> Slovak and partly English due to selected programs and information sources					
<b>Notes:</b> By default, teaching is carried out face to face. If this is not possible (eg due to a pandemic), teaching is provided at a distance through video conferencing programs and LMS.					
<b>Course assessment</b> Total number of assessed students: 109					
A	B	C	D	E	FX
77.06	11.01	7.34	0.0	4.59	0.0
<b>Provides:</b> Ing. Zuzana Tkáčová, Ing.Paed.IGIP.					
<b>Date of last modification:</b> 16.03.2024					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ ELP1/01	<b>Course name:</b> Electronics Practical
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 <b>Per study period:</b> 42 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 3	
<b>Recommended semester/trimester of the course:</b> 6.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> ÚFV/ELE1/07 or ÚFV/ELEM1/15	
<b>Conditions for course completion:</b> 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%).	
<b>Learning outcomes:</b> 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.	
<b>Brief outline of the course:</b> <ol style="list-style-type: none"> <li>1. Combinatorial logical circuits.</li> <li>2. Logical memory circuits.</li> <li>3. Logical sequence circuits.</li> <li>4. Rectifiers, filters, stabilizers.</li> <li>5. Generators of harmonic signals.</li> <li>6. Operational amplifiers and operational network interfaces.</li> <li>7. Digital-to-analog converters.</li> <li>8. Analog-to-digital converters.</li> <li>9. Reserve.</li> </ol>	
<b>Recommended literature:</b> <ol style="list-style-type: none"> <li>1. Delaney C.F.G.: Electronics for the Physicist with Applications. John Willey &amp; Sons, New York, 1980.</li> <li>2. Zbar P.B., Malvino A.P., Miller M.A.: Basic Electronics: a Text-Lab Manual. Macmillan/McGraw – Hill, New York, 1994.</li> </ol>	

<b>Course language:</b> 1. Slovak 2. English					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 43					
A	B	C	D	E	FX
90.7	2.33	2.33	4.65	0.0	0.0
<b>Provides:</b> RNDr. Vladimír Tkáč, PhD.					
<b>Date of last modification:</b> 20.09.2021					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ ELEM1/15	<b>Course name:</b> Electronics
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 <b>Per study period:</b> 42 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 3	
<b>Recommended semester/trimester of the course:</b> 5.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> ÚFV/VF1b/03 or ÚFV/VFM1b/15	
<b>Conditions for course completion:</b> Exam	
<b>Learning outcomes:</b> 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.	
<b>Brief outline of the course:</b> <ol style="list-style-type: none"> <li>1. Introduction to electronics: Basic components of electronic circuits, basic electrical laws</li> <li>2. Passive components, basic properties of semiconductors</li> <li>3. Semiconductors without PN junction, components with PN junction</li> <li>4. Semiconductors with PN junction</li> <li>5. Transistor phenomenon, transistor</li> <li>6. Electronic circuit with transistor</li> <li>7. Operational amplifiers</li> <li>8. Sources and generators</li> <li>9. Two-value logic algebra, combinational logic circuits</li> <li>10. Digital memory circuits</li> <li>11. Sequential logic circuits</li> <li>12. Digital-analog converters, analog-digital converters</li> </ol>	
<b>Recommended literature:</b> <ol style="list-style-type: none"> <li>1. Brown P.B., Frantz G.N., Moraaff H.: Electronics for the Modern Scientist. Elsevier, 1982.</li> <li>2. Delaney C.F.G.: Electronics for the Physicist with Applications. John Willey &amp; Sons, 1980.</li> <li>3. Wolt E. L.: Quantum Nanoelectronics, An introduction to electronic nanotechnology and quantum computing, Wiley-VCh, 2009</li> </ol>	
<b>Course language:</b> Slovak	
<b>Notes:</b>	

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

## COURSE INFORMATION LETTER

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

10. Talking about problem and solution 11. Referencing authors 12. Giving examples 13. Visual aids and numbers 14. Referencing time and place Presentation topics related to students' study fields.					
<b>Recommended literature:</b> lms.upjs.sk - e-kurz Odborný anglický jazyk pre prírodné vedy. Redman, S.: English Vocabulary in Use, Pre-intermediate, Intermediate. Cambridge University Press, 2003. Armer, T.: Cambridge English for Scientists. CUP, 2011. Wharton J.: Academic Encounters. The Natural World. CUP, 2009. P. Fitzgerald : English for ICT studies. Garnet Publishing, 2011. <a href="https://worldservice/learningenglish">https://worldservice/learningenglish</a> , <a href="https://spectator.sme.sk">https://spectator.sme.sk</a> <a href="http://www.isllibrary.com">www.isllibrary.com</a> <a href="http://linguahouse.com">linguahouse.com</a>					
<b>Course language:</b> English, level B2 (CEFR)					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 3386					
A	B	C	D	E	FX
38.07	26.61	16.75	9.51	7.0	2.07
<b>Provides:</b> Mgr. Viktória Mária Slovenská					
<b>Date of last modification:</b> 06.02.2024					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/ ENG1/21		<b>Course name:</b> Environmental Geology			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 1 / 1 <b>Per study period:</b> 14 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 3					
<b>Recommended semester/trimester of the course:</b> 3.					
<b>Course level:</b> I., II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 12					
A	B	C	D	E	FX
8.33	41.67	41.67	8.33	0.0	0.0
<b>Provides:</b> doc. Ing. Katarína Bónová, PhD., Mgr. Imrich Sládek, PhD.					
<b>Date of last modification:</b> 10.07.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/HYP/15		<b>Course name:</b> Fieldwork in Hydrology			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 3					
<b>Recommended semester/trimester of the course:</b> 4.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 88					
A	B	C	D	E	FX
94.32	4.55	0.0	1.14	0.0	0.0
<b>Provides:</b> RNDr. Alena Gessert, PhD., univerzitná docentka, Mgr. Jozef Šupinský, PhD.					
<b>Date of last modification:</b> 13.02.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/ GEP2/18		<b>Course name:</b> Fundamentals of Geology for Geographers			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 2 <b>Per study period:</b> 28 / 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 6					
<b>Recommended semester/trimester of the course:</b> 1.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b> Courses have following objectives: firstly, to introduce the current theories of processes which occur in the Earth (global tectonics, species of magmatism), secondly, to describe the rock-forming minerals, taxology of intrusive rocks, taxology of sedimentary rocks and rocks which had overcome metamorphosis, basics of the regional geology of Slovakia, basics of the historical geology and paleontology.					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 1249					
A	B	C	D	E	FX
7.61	18.41	32.35	25.94	9.77	5.92
<b>Provides:</b> doc. Ing. Katarína Bónová, PhD., Mgr. Anton Uhrin					
<b>Date of last modification:</b> 30.09.2021					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ ZMF2/22	<b>Course name:</b> Fundamentals of Mathematics for Physicists 2
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week: 2 Per study period: 28</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 3.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Summary evaluation based on ongoing assessment: <ol style="list-style-type: none"> <li>1. Two written tests of knowledge and skills during semester (at least 50% needed)</li> <li>2. Two group assignments - solving of two sets of problems (at least 50% needed)</li> <li>3. Active participation during face-to-face learning (3 absences allowed) and during online learning (no absence, all individual ongoing assignments)</li> </ol>	
<b>Learning outcomes:</b> The student should deepen and extend the basic ideas, knowledge and skills of mathematical concepts and methods in theoretical physics necessary for the study of theoretical disciplines (Theoretical Mechanics, Electromagnetic Field Theory, Quantum Mechanics and Statistical Physics) in the interdisciplinary study of Physics with another subject.	
<b>Brief outline of the course:</b> 01.- 02. Linear algebra and geometry: basic concepts and methods - update (matrices, determinants, systems of equations); curvilinear coordinate systems, transformations of coordinates 03.- 06. Vector and tensor analysis: basic concepts and theorems of vector analysis - update (flow, circulation, divergence, rotation, Gaussian and Stokes' theorem); basic identities of vector analysis, their proofs; tensors - algebraic operations, contractions, invariants; partial differential equations, wave equation 07.- 09. Special functions and distributions: functional series, Taylor and Fourier series; Dirac distribution and its representations; Legendre polynomials and other polynomial systems 10.- 13. Operators: basic concepts and classification (concept, linearity, eigenvalue and eigenfunction, commutativity); eigenfunctions and eigenvalues of linear Hermitian operators; matrix representation of operators, Dirac symbolism	
<b>Recommended literature:</b> <ol style="list-style-type: none"> <li>1. Kvasnica, J., Mathematical apparatus of Physics [in Czech], Academia, Praha, 1997</li> <li>2. Shankar, R. Basic Training in Mathematics: A Fitness Program for Science Students, Springer, New York, 1995</li> <li>3. Martin, B. R., &amp; Shaw, G. Mathematics for Physicists. John Wiley &amp; Sons, 2015</li> <li>4. Zimmermann et al., Computational Mathematics with SageMath, Creative Commons, 2018</li> </ol>	

<b>Course language:</b> Slovak					
<b>Notes:</b> The course builds on the course Fundamentals of Mathematics for Physicists I. The course is mainly aimed at gaining a clear idea of the concepts and their properties and to develop the ability to solve and apply knowledge in tasks related to the physical context using digital technologies (CAS software SageMath) as a discovery and verifying tool.					
<b>Course assessment</b> Total number of assessed students: 22					
A	B	C	D	E	FX
40.91	22.73	31.82	0.0	4.55	0.0
<b>Provides:</b> doc. RNDr. Jozef Hanč, PhD.					
<b>Date of last modification:</b> 11.05.2022					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ ZMF2/24	<b>Course name:</b> Fundamentals of Mathematics for Physicists 2
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 2.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Summary evaluation based on ongoing assessment: <ol style="list-style-type: none"> <li>1. Two written tests of knowledge and skills during semester (at least 50% needed)</li> <li>2. Two group assignments - solving of two sets of problems (at least 50% needed)</li> <li>3. Active participation during face-to-face learning (3 absences allowed) and during online learning (no absence, all individual ongoing assignments)</li> </ol>	
<b>Learning outcomes:</b> The student should deepen and extend the basic ideas, knowledge and skills of mathematical concepts and methods in theoretical physics necessary for the study of theoretical disciplines (Theoretical Mechanics, Electromagnetic Field Theory, Quantum Mechanics and Statistical Physics) in the interdisciplinary study of Physics with another subject.	
<b>Brief outline of the course:</b> 01.- 02. Linear algebra and geometry: basic concepts and methods - update (matrices, determinants, systems of equations); curvilinear coordinate systems, transformations of coordinates 03.- 06. Vector and tensor analysis: basic concepts and theorems of vector analysis - update (flow, circulation, divergence, rotation, Gaussian and Stokes' theorem); basic identities of vector analysis, their proofs; tensors - algebraic operations, contractions, invariants; partial differential equations, wave equation 07.- 09. Special functions and distributions: functional series, Taylor and Fourier series; Dirac distribution and its representations; Legendre polynomials and other polynomial systems 10.- 13. Operators: basic concepts and classification (concept, linearity, eigenvalue and eigenfunction, commutativity); eigenfunctions and eigenvalues of linear Hermitian operators; matrix representation of operators, Dirac symbolism	
<b>Recommended literature:</b> <ol style="list-style-type: none"> <li>1. Kvasnica, J., Mathematical apparatus of Physics [in Czech], Academia, Praha, 1997</li> <li>2. Shankar, R. Basic Training in Mathematics: A Fitness Program for Science Students, Springer, New York, 1995</li> <li>3. Martin, B. R., &amp; Shaw, G. Mathematics for Physicists. John Wiley &amp; Sons, 2015</li> <li>4. Zimmermann et al., Computational Mathematics with SageMath, Creative Commons, 2018</li> </ol>	

<b>Course language:</b> Slovak					
<b>Notes:</b> The course builds on the course Fundamentals of Mathematics for Physicists I. The course is mainly aimed at gaining a clear idea of the concepts and their properties and to develop the ability to solve and apply knowledge in tasks related to the physical context using digital technologies (CAS software SageMath) as a discovery and verifying tool.					
<b>Course assessment</b> Total number of assessed students: 9					
A	B	C	D	E	FX
44.44	44.44	11.11	0.0	0.0	0.0
<b>Provides:</b> doc. RNDr. Jozef Hanč, PhD.					
<b>Date of last modification:</b> 21.02.2024					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ ZMF/22	<b>Course name:</b> Fundamentals of Mathematics for Physicists I
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 1 / 2 <b>Per study period:</b> 14 / 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 3	
<b>Recommended semester/trimester of the course:</b> 1.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Summary evaluation based on ongoing assessment: <ol style="list-style-type: none"> <li>1. Two written tests of knowledge and skills during semester (at least 50% needed)</li> <li>2. Two group assignments - solving of two sets of problems (at least 50% needed)</li> <li>3. Active participation during face-to-face learning (3 absences allowed) and during online learning (no absence, all individual ongoing assignments)</li> </ol>	
<b>Learning outcomes:</b> Student should obtain and know to apply basic mathematical concepts and skills of the vector, differential and integral calculus (single-variable and multi-variable) and ordinary differential equations required for introductory physics courses: Mechanics & Molecular Physics and Electricity & Magnetism. At the same time, student should adapt to blended learning in higher education (face-to-face and online) with the help of today's digital technologies.	
<b>Brief outline of the course:</b> 01.-02. Introduction to the subject, the concept of a function of single variable and several variables, elementary functions, modeling real processes using functions 03.-04. Concept of ordinary and partial derivative, properties, rules and formulas, interpretation (geometric and physical) and applications of derivatives 05.-06. Concept of vector, directional derivative and gradient of a function of several variables Vector operations, rules for the directional derivative and the gradient of a function 07.-08. Test of knowledge and skills 1 Concept of integral, properties, rules, interpretation (geometric and physical) and applications of integrals 09.-10. Concept of differential equation (first and second order), DE solution procedures (separation of variables, variation of constants), application of DEs 11.-12. Test of knowledge and skills 2 Concept and forms of a complex number, arithmetic operations with complex numbers Concept of a vector function (field), circulation and flux of a vector field 13. Divergence, curl of a vector field, fundamental theorems of vector analysis	
<b>Recommended literature:</b>	



1. Kvasnica, J., Mathematical apparatus for physics [in Czech], Academia, Praha, 1997
2. Stewart, J., Calculus - Early Transcendentals, Brooks Cole, 8th ed., 2016
3. Hugh-Hallet, D. a kol., Calculus - Single Variable, Multivariable, 7th ed., Wiley, 2017
4. Zel'dovič, J.B., Jaglom, I.M., Higher Math for Beginners (Mostly Physicists and Engineers) [also in Slovak], Mir, Moskva, 1987
5. Zimmermann a kol., Computational Mathematics with SageMath, Creative Commons, 2018
6. Bard, G. V., Sage for Undergraduates. AMS, Providence, 2015
7. Hall, J., & Lingefjård, T., Mathematical Modeling: Applications with GeoGebra. Wiley, 2016

**Course language:**

slovak

**Notes:**

The course does not expect any knowledge of differential and integral calculus or complex numbers from a secondary school. The course is mainly aimed at gaining (1) clear idea and conceptual understanding of the concepts and their properties and (2) developing skills to model, solve and apply knowledge in problems related to the physics context and modelling using digital technologies as a discovery and verifying tool.

**Course assessment**

Total number of assessed students: 227

A	B	C	D	E	FX
40.97	21.59	18.06	9.69	8.81	0.88

**Provides:** doc. RNDr. Jozef Hanč, PhD.

**Date of last modification:** 26.01.2022

**Approved:** doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ VBFM1/15	<b>Course name:</b> General Biophysics I
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture <b>Recommended course-load (hours):</b> <b>Per week: 3 Per study period: 42</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 3	
<b>Recommended semester/trimester of the course:</b> 3.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> 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.	
<b>Learning outcomes:</b> 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.	
<b>Brief outline of the course:</b> 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:** prof. Mgr. Daniel Jancura, PhD.

**Date of last modification:** 17.09.2021

**Approved:** doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ VF1a/12	<b>Course name:</b> General Physics I
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 4 / 2 <b>Per study period:</b> 56 / 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 7	
<b>Recommended semester/trimester of the course:</b> 1.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> 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	
<b>Learning outcomes:</b> 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.	
<b>Brief outline of the course:</b> 1. Basic knowledge of the calculus, vector algebra. Standards and units. 2. Mechanics of particle. 3. Gravitational field. 4. Work, power and energy. 5. Mechanics of system of particles. 6. Mechanics of rigid body. 7. Mechanics of elastic body. 8. Mechanics of fluids. 9. Basics of molecular physics. Structure and properties of gases. 10. Basics of thermodynamics. 11. Heat transfer. Thermal expansion. 12. Structure and properties of liquids 13. Changes of state.	

<b>Recommended literature:</b> CUMMINGS, Karen, LAWS, Priscilla, REDISH, Edward, COONEY, Patrick: Understanding Physics, John Wiley & Sons, 2004					
<b>Course language:</b> English					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 374					
A	B	C	D	E	FX
23.26	14.44	21.93	14.71	16.84	8.82
<b>Provides:</b> doc. RNDr. Zuzana Ješková, PhD., RNDr. Katarína Kozelková, PhD.					
<b>Date of last modification:</b> 15.09.2021					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ VF1b/24	<b>Course name:</b> General Physics II
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 4 / 2 <b>Per study period:</b> 56 / 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 7	
<b>Recommended semester/trimester of the course:</b> 3.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> To successfully complete the course (presence, if necessary distance), the student must demonstrate sufficient understanding of the basic concepts and laws of electromagnetism, so that it is possible to continue the study of general physics III, IV and the discipline of electromagnetic field theory. Knowledge of individual laws of electricity and magnetism and their generalization in the form of Maxwell's equations is required. Knowledge of these laws in nature and in practical use is required. Another requirement is adequate skills in solving the problems of electricity and magnetism. Credit evaluation takes into account the scope of teaching (4 hours of lectures, 2 hours of numerical exercises, 4 credits), self-study (1 credit), evaluation (2 credits) and the fact that it is a basic subject that is part of the bachelor's state exam. The minimum limit for successful completion of the course is to obtain 50 points from the subsequent point evaluation, while it is necessary to obtain at least 50% of points from each part: Numerical exercises maximum number of 20 points (usually 2 written tests of 10 points each, the student must obtain at least 5 points from each test) Oral exam with a maximum of 80 points (answer to three questions, each of which must reach a level of at least 50%). Rating scale A 100-91 B 90-81 C 80-71 D 70-61 E 60-50 Fx 49-0	
<b>Learning outcomes:</b> After completing lectures and exercises, the student will have sufficient knowledge of the basics of electricity and magnetism and will be able to solve numerical problems of electromagnetism. He will also gain adequate knowledge about electromagnetic phenomena in nature and the use of electromagnetic phenomena in technical applications.	
<b>Brief outline of the course:</b>	

1. Week: Electrostatic field in vacuum. Culomb's law. Electric field. Electric dipole. Flux of electric field. Gauss' law.
2. Week: Work of forces in the electrostatic field. Potential. Relationship between electric field and electric potential. Potential and its measurement. Capacity of conductor and conductor system. Energy of electrostatic field.
3. Week: Stationary electric field and steady electric current. Ohm's law. Superconductivity. Equation of continuity of electric current. Electrical circuits with steady voltage. Kirchhoff's laws and their application. Work, power, energy and efficiency of the source of electromotive voltage.
4. Week: Electric current in electrolytes, semiconductors, gases and in vacuum. Thermoelectric phenomena and their use.
5. Week: Origin, properties and basic quantities of a stationary magnetic field in vacuum. Biot-Savart law and its application. Magnetic flux density.
6. Week: Interactions of a magnetic field with moving electrically charged particles and with electric currents. Ampere's law. Interaction between current conductors. Definition of ampere as current unit. Lorentz force.
7. Week: Quasi-stationary electric field. Capacitor charging and discharging process (R-C circuit). The phenomenon of electromagnetic induction. Faraday's law. Phenomenon of self-induction and mutual induction, inductance, mutual inductance. Potential of magnetic field.
8. Week: Transient in the R-L circuit. Energy of magnetic field. Energy conservation law. Magnetic dipole. Alternating currents and basic circuits of alternating electric current. RLC circuit
9. Week: Serial and parallel resonance. Multiphase currents. Rotating magnetic field. Formation of multiphase currents. Electric motor. Power of alternating electric current.
10. Week: Electrical phenomena in the material environment. Dielectric polarization, mechanisms. Electric field in dielectric. Interaction of electric charges stored in a dielectric. Gauss' law. Polarization vector and electrical induction vector and their mutual relationship. Linear and nonlinear dielectrics.
11. Week: Magnetic properties of substances. Elementary magnetic field of an atom. Magnetic state of substances. Magnetic polarization. Diamagnetism and paramagnetism. Arranged magnetic structure. Ferromagnets.
12. Week: Unsteady electromagnetic field. Maxwell's equations.

**Recommended literature:**

T. Matsushita: Electricity and Magnetism, Springer, 2017

**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: 391

A	B	C	D	E	FX
34.78	14.58	16.37	12.28	9.72	12.28

**Provides:** prof. RNDr. Peter Kollár, DrSc., doc. RNDr. Adriana Zeleňáková, DrSc., doc. RNDr. Erik Čížmár, PhD.

**Date of last modification:** 21.02.2024

**Approved:** doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚFV/ VF1c/24		<b>Course name:</b> General Physics III			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 4 / 2 <b>Per study period:</b> 56 / 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 7					
<b>Recommended semester/trimester of the course:</b> 2.					
<b>Course level:</b> I.					
<b>Prerequisites:</b> ÚFV/VF1a/12					
<b>Conditions for course completion:</b> Written test (2x) from seminars during the semester. Oral examination.					
<b>Learning outcomes:</b> The objective is to acquaint the students with the basis of oscilations, waves and optics.					
<b>Brief outline of the course:</b> Undamped oscilations, Mathematical, Physical and Torsional pendulum, Damped oscilations, Fourier transformation, Forced oscilations. 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 emision and absorption, Planck's law of radiation. Lasers.					
<b>Recommended literature:</b> 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					
<b>Course language:</b> slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 59					
A	B	C	D	E	FX
23.73	23.73	28.81	15.25	8.47	0.0
<b>Provides:</b> doc. RNDr. Ján Fúzer, PhD., RNDr. Samuel Dobák, PhD.					
<b>Date of last modification:</b> 21.02.2024					

**Approved:** doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ VF1d/22	<b>Course name:</b> General Physics IV
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 / 1 <b>Per study period:</b> 42 / 14 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 5	
<b>Recommended semester/trimester of the course:</b> 4.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> ÚFV/VF1c/10 or ÚFV/VF1c/12 or ÚFV/VF1c/22 or ÚFV/VF1c/24	
<b>Conditions for course completion:</b> - 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 (1credits), evaluation (1credits), a total of 5credits. Minimum limit for completion of the course is to obtain at least 51% of the total evaluation.	
<b>Learning outcomes:</b> The student will get basic information about the structure of the atom, atomic spectra, atomic nucleus and elementary particles. He will become familiar with the basic experimental methods and with the passage of ionizing radiation through the environment, he will gain an overview of the applications of nuclear radiation methods in practice. He will be able to independently solve tasks and problems in the field of atomic and nuclear physics.	
<b>Brief outline of the course:</b> 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). Angular 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. 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.	

<p>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).</p> <p>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.</p> <p>Nuclear reactions: Basic terms and definitions. Classification of nuclear reactions. Conservation laws. Effective cross section. Mechanisms of nuclear reactions. Basic types of reactions. Reactions with neutrons. Fission of atomic nuclei. Thermonuclear reactions.</p> <p>Week 13 Subnuclear physics - A.Kravčáková (P):</p> <p>Elementary particles: Basic characteristics of particles. Conservation laws. Types of interactions. Classification of elementary particles. Quark model of hadrons.</p> <p>Week 14 Experimental methods - A.Kravčáková (P):</p> <p>Passage of radiation through matter.</p> <p>Detectors: Basic characteristics of detectors. Gas detectors, Scintillation, Cherenkov and semiconductor detectors. Track detectors.</p> <p>Particle accelerators: Linear accelerator. Cyclic accelerators. Colliders.</p>																	
<p><b>Recommended literature:</b></p> <ol style="list-style-type: none"> <li>1. Beiser A., Úvod do moderní fyziky, Praha, 1975.</li> <li>2. Úlehla I., Suk M., Trka Z.: Atómy, jadra, částice, Praha, 1990.</li> <li>3. Síleš E., Martinská G.: Všeobecná fyzika IV, skriptá PF UPJŠ, 2. vydanie, Košice, 1992.</li> <li>4. Vrláková J., Kravčáková A., Vokál S.: Zbierka príkladov z atómovej a jadrovej fyziky, skriptá PF UPJŠ, Košice, 2016.</li> <li>5. Kravčáková A., Vokál S., Vrláková J., Všeobecná fyzika IV, 1.časť Atómová fyzika, skriptá PF UPJŠ, Košice, 2020.</li> <li>6. Yang F., Hamilton J.H., Modern Atomic and Nuclear Physics, WSC Singapore, 2010.</li> </ol>																	
<p><b>Course language:</b> slovak and english</p>																	
<p><b>Notes:</b></p>																	
<p><b>Course assessment</b> Total number of assessed students: 148</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>41.22</td><td>28.38</td><td>13.51</td><td>8.11</td><td>8.78</td><td>0.0</td></tr> </tbody> </table>						A	B	C	D	E	FX	41.22	28.38	13.51	8.11	8.78	0.0
A	B	C	D	E	FX												
41.22	28.38	13.51	8.11	8.78	0.0												
<p><b>Provides:</b> doc. RNDr. Adela Kravčáková, PhD., doc. RNDr. Janka Vrláková, PhD., RNDr. Zuzana Paulínyová, PhD.</p>																	
<p><b>Date of last modification:</b> 23.08.2022</p>																	
<p><b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.</p>																	

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚGE/ GIS/15	<b>Course name:</b> Geographic Information Systems
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 2 <b>Per study period:</b> 28 / 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 6	
<b>Recommended semester/trimester of the course:</b> 3.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> The assessment is a combination of continual control during the practicals and the final exam in the examination period. The continual assessment is performed during the semester and it involves 2 written tests in the mid-term and end of the semester and a project report generated according to the assignment and practical skills acquired during the practicals. The student can proceed to the final exam in case he or she acquired at least 50 points of 100 in all elements of the the continual assessment. The final assessment mark is based on the average number points received in the mid-term test, project report, practicals assessment, and final exam. The final exam is a written test comprising 3-4 questions. The credits are given in case the student had reached at least the E mark in continual assessment and final exam. The following marking scheme is applied in the assessment: A (100-90 points), B (80-89 points), C (70-79 points), D (60-69 points), E (50-59 points), FX (0-49 points).	
<b>Learning outcomes:</b> The students gain knowledge on the intermediate levele in the theory of geoinformation science, GIS, and Remote Sensing, GIS data models, methods of data processing and spatial analysis. They gain practical skills in processing of geographic data, management, analysis, and visualisation of the geographic data in a GIS project. Students acquire competence in defining a GIS project, suitable data models, methods of data acquisition, data processing, analysis and visualisation, presentation skills and skills in team work.	
<b>Brief outline of the course:</b> The course is focused on the following topics: geoinformatics as a scientific discipline, components of geographic information system, digital landscape representation and data models, GIS standards for coordinate systems and transformations, collection of geographic data for GIS (GNSS, photogrammetry, multispectral satellite imagery, lidar, radar) , data management in GIS, attribute and spatial demands, layer overlap, map algebra, spatial prediction, quality and uncertainty of geographic data, GIS web solutions, legislative aspects in GIS, GIS applications in practice. Exercises are focused on working in ArcGIS Pro: basic and advanced vectorization, data organization in the geodatabase, import / export of various data formats to GIS, creation of color compositions from satellite images, mapping, 3D visualization and animation of geographic data, geoprocessing, map algebra, spatial and attribute demands, spatial prediction, analysis of digital	

elevation models (DEM). Students learn the topics of the semester project in the middle of the semester and solve the assigned task in the team using the skills and knowledge acquired during the semester.					
<b>Recommended literature:</b>					
<b>Course language:</b> Slovak or Czech or English					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 414					
A	B	C	D	E	FX
27.54	27.05	27.29	12.8	5.31	0.0
<b>Provides:</b> doc. Mgr. Michal Gallay, PhD., Mgr. Michaela Nováková, PhD.					
<b>Date of last modification:</b> 27.06.2022					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/ GEOM1/21		<b>Course name:</b> Geography			
<b>Course type, scope and the method:</b> <b>Course type:</b> <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b>					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 53					
A	B	C	D	E	FX
18.87	11.32	15.09	22.64	24.53	7.55
<b>Provides:</b>					
<b>Date of last modification:</b> 26.02.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/ GNB/21		<b>Course name:</b> Geography of Religion			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 1 / 1 <b>Per study period:</b> 14 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 3					
<b>Recommended semester/trimester of the course:</b> 3.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 28					
A	B	C	D	E	FX
17.86	14.29	32.14	25.0	10.71	0.0
<b>Provides:</b> doc. Mgr. Ladislav Novotný, PhD.					
<b>Date of last modification:</b> 27.06.2022					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/ GPOL/21		<b>Course name:</b> Geography of agriculture and industry			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 1 / 1 <b>Per study period:</b> 14 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 3					
<b>Recommended semester/trimester of the course:</b> 4.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 32					
A	B	C	D	E	FX
31.25	12.5	28.13	18.75	9.38	0.0
<b>Provides:</b> Mgr. Marián Kulla, PhD., doc. Mgr. Ladislav Novotný, PhD.					
<b>Date of last modification:</b> 14.02.2023					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/ MOG/24		<b>Course name:</b> Geography of mining			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 1 / 1 <b>Per study period:</b> 14 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 2.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 6					
A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0
<b>Provides:</b> doc. Ing. Katarína Bónová, PhD., Mgr. Imrich Sládek, PhD.					
<b>Date of last modification:</b> 10.07.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/ GST/21		<b>Course name:</b> Geography of services and tourism			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 1 / 1 <b>Per study period:</b> 14 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 3					
<b>Recommended semester/trimester of the course:</b> 5.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 20					
A	B	C	D	E	FX
20.0	25.0	30.0	20.0	5.0	0.0
<b>Provides:</b> Mgr. Marián Kulla, PhD., doc. Mgr. Ladislav Novotný, PhD., doc. Mgr. Michal Gallay, PhD.					
<b>Date of last modification:</b> 27.06.2022					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/ GCR1/21		<b>Course name:</b> Geography of the Czech Republic			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b> 5.					
<b>Course level:</b> I., II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 16					
A	B	C	D	E	FX
25.0	12.5	43.75	12.5	6.25	0.0
<b>Provides:</b> Mgr. Marián Kulla, PhD., doc. Mgr. Ladislav Novotný, PhD., Mgr. Imrich Sládek, PhD.					
<b>Date of last modification:</b> 27.06.2022					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/ GAH/21		<b>Course name:</b> Geography of the atmosphere and hydrosphere			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 / 1 <b>Per study period:</b> 42 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 6					
<b>Recommended semester/trimester of the course:</b> 3.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 110					
A	B	C	D	E	FX
8.18	20.91	32.73	32.73	5.45	0.0
<b>Provides:</b> RNDr. Alena Gessert, PhD., univerzitná docentka, prof. Mgr. Jaroslav Hofierka, PhD., Mgr. Tomáš Fedor, Mgr. Jozef Šupinský, PhD.					
<b>Date of last modification:</b> 09.09.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/ GPED/21		<b>Course name:</b> Geography of the pedosphere and biosphere			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 / 1 <b>Per study period:</b> 42 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 6					
<b>Recommended semester/trimester of the course:</b> 4.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 117					
A	B	C	D	E	FX
1.71	10.26	18.8	29.91	21.37	17.95
<b>Provides:</b> doc. Mgr. Michal Gallay, PhD., RNDr. Alena Gessert, PhD., univerzitná docentka, Mgr. Anton Uhrin, Mgr. Jozef Šupinský, PhD.					
<b>Date of last modification:</b> 09.09.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚGE/ SGI2/21	<b>Course name:</b> Geoinformatics seminar
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 3	
<b>Recommended semester/trimester of the course:</b> 6.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b>	
<b>Learning outcomes:</b>	
<b>Brief outline of the course:</b>	
<b>Recommended literature:</b>	
<b>Course language:</b>	
<b>Notes:</b>	
<b>Course assessment</b> Total number of assessed students: 17	
abs	n
100.0	0.0
<b>Provides:</b> doc. Mgr. Michal Gallay, PhD., Mgr. Katarína Onačillová, PhD.	
<b>Date of last modification:</b> 27.06.2022	
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.	

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚGE/ GEX2/21	<b>Course name:</b> Geological excursion
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> 3d <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 2.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b>	
<b>Learning outcomes:</b>	
<b>Brief outline of the course:</b>	
<b>Recommended literature:</b>	
<b>Course language:</b>	
<b>Notes:</b>	
<b>Course assessment</b> Total number of assessed students: 115	
abs	n
100.0	0.0
<b>Provides:</b> doc. Ing. Katarína Bónová, PhD.	
<b>Date of last modification:</b> 27.06.2022	
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.	



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/ GMP/21		<b>Course name:</b> Geomorphological mapping			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 3					
<b>Recommended semester/trimester of the course:</b> 4.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 20					
A	B	C	D	E	FX
20.0	20.0	55.0	0.0	5.0	0.0
<b>Provides:</b> RNDr. Alena Gessert, PhD., univerzitná docentka, Mgr. Jozef Šupinský, PhD.					
<b>Date of last modification:</b> 09.09.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/ GEM2/18		<b>Course name:</b> Geomorphology			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 2 <b>Per study period:</b> 28 / 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 6					
<b>Recommended semester/trimester of the course:</b> 2.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 1411					
A	B	C	D	E	FX
10.35	20.55	21.26	17.72	19.28	10.84
<b>Provides:</b> RNDr. Alena Gessert, PhD., univerzitná docentka, Mgr. Imrich Sládek, PhD., doc. Ing. Katarína Bónová, PhD.					
<b>Date of last modification:</b> 08.09.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KPE/ POŽ/21		<b>Course name:</b> Getting to know the Student in Education			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 4.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 144					
A	B	C	D	E	FX
61.81	26.39	6.25	2.08	0.0	3.47
<b>Provides:</b> PaedDr. Michal Novocký, PhD., Mgr. Beáta Galajda, PhD.					
<b>Date of last modification:</b> 22.09.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/ EXH/25		<b>Course name:</b> Human Geography Excursion			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> 6d <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 3					
<b>Recommended semester/trimester of the course:</b> 5.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 27					
A	B	C	D	E	FX
40.74	29.63	22.22	7.41	0.0	0.0
<b>Provides:</b> Mgr. Marián Kulla, PhD., doc. Mgr. Ladislav Novotný, PhD.					
<b>Date of last modification:</b> 26.02.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/ HGS1/21		<b>Course name:</b> Human Geography of Slovakia			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 5					
<b>Recommended semester/trimester of the course:</b> 5.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 74					
A	B	C	D	E	FX
2.7	14.86	21.62	28.38	29.73	2.7
<b>Provides:</b> RNDr. Janetta Nestorová-Dická, PhD., univerzitná docentka, Mgr. Marián Kulla, PhD., doc. Mgr. Ladislav Novotný, PhD., Mgr. Daniela Buchalová, PhD.					
<b>Date of last modification:</b> 27.06.2022					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KPE/ INP/17		<b>Course name:</b> Inclusive Pedagogy			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 5.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 139					
A	B	C	D	E	FX
71.94	21.58	2.88	1.44	2.16	0.0
<b>Provides:</b> PaedDr. Michal Novocký, PhD.					
<b>Date of last modification:</b> 22.09.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KPE/ IIŠP/21		<b>Course name:</b> Integration and Inclusion in School Practice			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 3.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 118					
A	B	C	D	E	FX
50.0	34.75	8.47	5.08	0.85	0.85
<b>Provides:</b> PaedDr. Michal Novocký, PhD., Mgr. Zuzana Vagaská, PhD.					
<b>Date of last modification:</b> 22.09.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚGE/ ZEX1/21	<b>Course name:</b> International Excursion 1
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> 10d <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 4	
<b>Recommended semester/trimester of the course:</b> 4.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b>	
<b>Learning outcomes:</b>	
<b>Brief outline of the course:</b>	
<b>Recommended literature:</b>	
<b>Course language:</b>	
<b>Notes:</b>	
<b>Course assessment</b> Total number of assessed students: 43	
abs	n
88.37	11.63
<b>Provides:</b> doc. Mgr. Ladislav Novotný, PhD., Mgr. Marián Kulla, PhD.	
<b>Date of last modification:</b> 27.06.2022	
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.	



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ UVF/05	<b>Course name:</b> Introduction to General Physics
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week: 2 Per study period: 28</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 1.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> 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	
<b>Learning outcomes:</b> 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.	
<b>Brief outline of the course:</b> 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.					
<b>Recommended literature:</b> CUMMINGS, Karen, LAWS, Priscilla, REDISH, Edward, COONEY, Patrick: Understanding Physics, John Wiley & Sons, 2004					
<b>Course language:</b> English					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 370					
A	B	C	D	E	FX
36.76	20.81	24.32	13.51	4.32	0.27
<b>Provides:</b> doc. RNDr. Zuzana Ješková, PhD., RNDr. Katarína Kozelková, PhD.					
<b>Date of last modification:</b> 15.09.2021					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ UVF2/24	<b>Course name:</b> Introduction to General Physics II
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week: 2 Per study period: 28</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 3.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> 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	
<b>Learning outcomes:</b> 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.	
<b>Brief outline of the course:</b> 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.	
<b>Recommended literature:</b>	

Matsushita, Teruo. Electricity and Magnetism, Springer 2017 CUMMINGS, Karen, LAWS, Priscilla, REDISH, Edward, COONEY, Patrick: Understanding Physics, John Wiley & Sons, 2004					
<b>Course language:</b> English					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 2					
A	B	C	D	E	FX
0.0	50.0	0.0	0.0	50.0	0.0
<b>Provides:</b> doc. RNDr. Zuzana Ješková, PhD.					
<b>Date of last modification:</b> 21.02.2024					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ UFMI/07	<b>Course name:</b> Introduction to Microworld Physics
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 4	
<b>Recommended semester/trimester of the course:</b> 6.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> 1. Active participation in lectures and excersises 2. Written semester task and its presentation, exam. Credit evaluation of the subject: direct teaching and consultations (1 credit), self-study (1 credit), practical activities - semester task (1 credit) and evaluation (1 credit). Total 4 credits. The minimum threshold for completing the course is to obtain at least 51% of the total evaluation, using the following rating scale: A (91-100%), B (81-90%), C (71-80%), D (61-70 %), E (51-60%), F (0-50%).	
<b>Learning outcomes:</b> After completing the course, students will get a qualitative overview of the discoveries and advances in elementary particle physics (PEP) from its beginning to the present. They will become familiar with the latest theories of particle physics and their connections with cosmology. At the same time, they will acquire the ability to independently solve simple problems from the mentioned areas.	
<b>Brief outline of the course:</b> 1. Atom and nucleus: Atoms as a composed particles, electron discovery, Thomsons model, natural radioactivity. 2. Discovery of the nucleus, Rutherfords model, Bohrs model of the atom, neutron discovery, the structure of the nucleus. 3. Interactions in nature: gravity, electromagnetic, weak and strong - strenght, range, intermediators. 4. Units in particle physics - length, mass a energy. 5. Latest knowledges about the structure of matter and forces: Nuclear particles - particle "ZOO". 6. Classification of particles, eightfold way, quark model 7. Standart model: strong interaction – quarks, gluons and colour charge. 8. Theory of elektroweak interactions. 9. New discoveries, Grand Unification. 10. Cosmology, particle physics and Big Bang. 11. Experimental methods in Particle Physics: basic principles of acceleration and detection of particles. 12. Experiments on LHC collider.	
<b>Recommended literature:</b>	

1. M. Veltman: Facts and Mysteries in Elementary Particle Physics, World Scientific Publishing, 2003.
2. F. Close: Particle Physics, A Very Short Introduction, Oxford, 2004.
3. F. Close: The cosmic onion, Quarks and the Nature of the Universe, Heinemann Educational Books, 1990.
4. R. Mackintosh, J. Al-Khalili, B. Jonson, T. Pena: Jádno, Cesta do srdce hmoty, Academia Praha, 2003.
5. S. Brandt: The Harvest of a Century, Oxford, 2009.

**Course language:**

slovak and english

**Notes:**

**Course assessment**

Total number of assessed students: 28

A	B	C	D	E	FX
85.71	10.71	3.57	0.0	0.0	0.0

**Provides:** doc. RNDr. Adela Kravčáková, PhD., Mgr. Lucia Anna Tarasovičová, Dr. rer. nat.

**Date of last modification:** 23.08.2022

**Approved:** doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> Dek. PF UPJŠ/USPV/13	<b>Course name:</b> Introduction to Study of Sciences
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> 12s / 3d <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 1.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b>	
<b>Learning outcomes:</b>	
<b>Brief outline of the course:</b>	
<b>Recommended literature:</b>	
<b>Course language:</b>	
<b>Notes:</b>	
<b>Course assessment</b> Total number of assessed students: 2392	
abs	n
90.22	9.78
<b>Provides:</b> doc. RNDr. Marián Kireš, PhD.	
<b>Date of last modification:</b> 30.08.2022	
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.	

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/ UDID/21		<b>Course name:</b> Introduction to the didactics of geography			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 1 / 1 <b>Per study period:</b> 14 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 6.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 15					
A	B	C	D	E	FX
53.33	40.0	6.67	0.0	0.0	0.0
<b>Provides:</b> RNDr. Stela Csachová, PhD.					
<b>Date of last modification:</b> 27.06.2022					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/LOS/18		<b>Course name:</b> Linux and open source GIS			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 3					
<b>Recommended semester/trimester of the course:</b> 3.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 82					
A	B	C	D	E	FX
62.2	34.15	3.66	0.0	0.0	0.0
<b>Provides:</b> Mgr. Michaela Nováková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					
<b>Date of last modification:</b> 30.09.2021					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ MTFa/15	<b>Course name:</b> Mathematics I for physicists
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 2 <b>Per study period:</b> 28 / 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 5	
<b>Recommended semester/trimester of the course:</b> 1.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> 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.	
<b>Learning outcomes:</b> 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.	
<b>Brief outline of the course:</b> 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.	
<b>Recommended literature:</b> 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	
<b>Course language:</b> Slovak	
<b>Notes:</b>	

<b>Course assessment</b>					
Total number of assessed students: 133					
A	B	C	D	E	FX
20.3	12.78	18.05	15.79	21.05	12.03
<b>Provides:</b> RNDr. Jana Borzová, PhD., RNDr. Miriama Kmeciková					
<b>Date of last modification:</b> 18.04.2022					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/MTFb/22	<b>Course name:</b> Mathematics II for physicists
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 2 <b>Per study period:</b> 28 / 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 5	
<b>Recommended semester/trimester of the course:</b> 2.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> ÚMV/MTFa/15	
<b>Conditions for course completion:</b> Mastering standard procedures for solving systems of linear equations. Understanding the concept of function of several variables, mastering the definitions of limit of function, partial derivation of a function, differential of a function, local and global extrema of a function and acquiring skills associated with their use in calculations focused mainly on functions of two variables. Mastering standard procedures for solving basic types of ordinary differential equations of the 1st order. Understanding the concept of infinite series and acquiring skills to use the basic criteria of convergence of number series for deciding on the convergence or divergence of number series. Assessment is given on the basis of a continuous assessment and a written exam, which also includes an oral exam. Ongoing evaluation: Two tests during the semester - 32 p. Small written tests during the semester - 10 p. Solving homework - 4 p. Active participation in exercises - 4. p. An exam: Final test and oral exam - 30 p. Classification scale: A: 91 % - 100 %, B: 81 % - 90 %, C: 71 % - 80 %, D: 61 % - 70 %, E: 51 % - 60 %, FX: 0 % - 50 %.	
<b>Learning outcomes:</b> The student should be able to explain the basic concepts and gain skills in using standard procedures for solving systems of linear equations using matrices and determinants. The student will expand his knowledge of the function of one variable and master the concept of a function of several variables, and will be able to explain the definitions of function limit, partial derivation of a function, differential of a function, local and global extrema of a function and acquire knowledge and skills oriented mainly on the functions of two variables. The student will learn standard procedures for solving basic types of ordinary differential equations of the 1st order. He will be able to use the acquired knowledge about solving differential equations in modeling and solving problems derived from real situations. The student will gain skills to use the basic criteria of convergence of number series when deciding on the convergence or divergence of number series.	

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

**Brief outline of the course:**

1. - 3. Systems of linear equations, matrices, determinants.
4. - 7. Functions of several variables, continuity and limit, partial derivatives, differential, local and global extrema of a function of two variables.
8. - 11. Modeling of relations between quantities using differential equations. Methods for solving ordinary differential equations of the 1st order.
12. - 13. Sequences, infinite number series, convergence criteria of infinite number series, infinite functional series, Taylor series.

**Recommended literature:**

Huťka, V., Benko, E., Ďurikovič, V.: Matematika, Alfa, Bratislava 1991.  
Kluvánek, I., Mišík, L., Švec, M.: Matematika II, Bratislava, 1961.  
Osička, J.: Matematika pro chemiky, Brno, 2004.  
Došlá, Z.: Matematika pro chemiky, Masarykova univerzita, Brno, 2011.  
Hughes-Hallett, D., et al.: Applied Calculus. John Wiley & Sons, Inc., 2010.  
Rogers, R., C.: The Calculus of Several Variables. 2011.

**Course language:**

Slovak

**Notes:**

**Course assessment**

Total number of assessed students: 357

A	B	C	D	E	FX
18.21	15.13	20.17	21.85	23.25	1.4

**Provides:** doc. RNDr. Stanislav Lukáč, PhD., RNDr. Miriama Kmeciková

**Date of last modification:** 18.04.2022

**Approved:** doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KPE/MKŠP/21		<b>Course name:</b> Mentoring and Coaching in School Practice			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 5.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 86					
A	B	C	D	E	FX
88.37	9.3	2.33	0.0	0.0	0.0
<b>Provides:</b> Mgr. Beáta Galajda, PhD., Mgr. Soňa Szabó					
<b>Date of last modification:</b> 22.09.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/ MPG/21		<b>Course name:</b> Metageography and planetary geography			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 1 / 1 <b>Per study period:</b> 14 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 1.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 174					
A	B	C	D	E	FX
47.13	42.53	8.05	0.57	0.0	1.72
<b>Provides:</b> prof. Mgr. Jaroslav Hofierka, PhD., Mgr. Katarína Onáčillová, PhD., Mgr. Nikola Svetozarov					
<b>Date of last modification:</b> 27.06.2022					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ SDFM1/15	<b>Course name:</b> Methods of Data Processing in Physics
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 3	
<b>Recommended semester/trimester of the course:</b> 3.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b>	
<b>Learning outcomes:</b>	
<b>Brief outline of the course:</b> <ol style="list-style-type: none"> <li>1. Numerical processes and their errors. Particular properties of computer representation of numerical data. Introduction in Matlab/Octave.</li> <li>2. Approximation and interpolation of a function. Algebraic multinomials. Newton, Lagrange, Hermit and spline interpolation. Selection of interpolation knots.</li> <li>3. Numerical methods for calculation of definite integral – rectangular, trapezoidal, Simpson.</li> <li>4. Numerical differentiation.</li> <li>5. Numerical solution of ordinary differential equations – Euler's method and modifications, Runge-Kutta method.</li> <li>6. Approximate solution of non-linear equations. Roots separation, simple iteration and its convergency. Tangent, secant and combined methods.</li> <li>7. Iterative solution of linear system of algebraic equations, Gauss method.</li> <li>8. Linear regression. Regression models, least-square criterion.</li> <li>10. Non-linear regression models.</li> <li>8. Basics of probability theory and mathematical statistics - systematic and random errors, Gaussian distribution, three-sigma rule, central limit theorem.</li> <li>11. Computer simulation of real processes - Monte-Carlo method (principles, random quantities, pseudo-random number generators).</li> <li>12. Simulation of particle transport through solid.</li> </ol>	
<b>Recommended literature:</b> <ol style="list-style-type: none"> <li>1. Buchanan J. L., Turner P. R.: Numerical Methods and Analysis. McGraw-Hill, Inc., New York, 1992.</li> <li>2. Hrach R.: Počítačová fyzika I,II. Skriptum PF UJEP. Ed. stredisko UJEP, Ústí nad Labem, 2003.</li> <li>3. Petrovič P., Nadrchal J., Petrovičová J.: Programovanie a spracovanie dát I, II. Edičné stredisko UPJŠ, Košice 1989.</li> <li>4. Petrovič P.: Fyzika I – Vybrané kapitoly z klasickej fyziky a počítačovej fyziky. Vydavateľstvo equilibria, Košice, 2009.</li> </ol>	



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 Čížmár, PhD.

**Date of last modification:** 21.09.2021

**Approved:** doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/MFYU/15	<b>Course name:</b> Methods of Physical Problems Solving
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week: 2 Per study period: 28</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 5.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Summary evaluation based on ongoing assessment: <ol style="list-style-type: none"> <li>1. Practical ongoing assignments for given topics and their defense (at least 50% needed)</li> <li>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)</li> </ol>	
<b>Learning outcomes:</b> The student will gain the following knowledge and skills <ol style="list-style-type: none"> <li>1. overview of qualitative, quantitative and experimental methods of solving physical problems</li> <li>2. can model a given physical problem and apply appropriate methods of solution according to the nature of the physical problem</li> <li>3. can effectively use digital technologies on PC, mobile and tablet in solving physical problems.</li> </ol>	
<b>Brief outline of the course:</b> Introduction to the subject <ol style="list-style-type: none"> <li>1. Overview of approaches, methods and means, sources of physical problems, competitions</li> </ol> Qualitative approaches in solving <ol style="list-style-type: none"> <li>2. Simple thought modeling and Fermi estimates,</li> <li>3. Dimensional analysis, scaling</li> <li>4. Application of symmetry and conservation laws</li> <li>5. Graphic methods</li> </ol> Experiment and digital technologies in solving <ol style="list-style-type: none"> <li>6. Animations and simple simulations (Geogebra, Phet, Workbench, Physlets)</li> <li>7. Video analysis (Tracker), iconographic modeling (VnR, Coach)</li> <li>8. Computer-aided, remote and virtual experiments (PC, tablet, mobile)</li> </ol> Quantitative approaches in solving <ol style="list-style-type: none"> <li>9. Models in the form of differential equations - computer modeling (Sage, Jupyter)</li> <li>10. Symbolic and numerical solutions (Sage, Jupyter),</li> </ol> More advanced approaches to solutions <ol style="list-style-type: none"> <li>11. Qualitative approach through the theory of dynamical systems</li> <li>12. Variational approaches (Lagrange, Hamilton)</li> </ol>	

13. 2D and 3D visualization and verification of solutions using a computer (Sage, Vpython)					
<b>Recommended literature:</b> 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, <a href="http://www.physics.pomona.edu/sixideas/">http://www.physics.pomona.edu/sixideas/</a> 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					
<b>Course language:</b> Slovak, English					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 13					
A	B	C	D	E	FX
84.62	7.69	7.69	0.0	0.0	0.0
<b>Provides:</b> doc. RNDr. Jozef Hanč, PhD.					
<b>Date of last modification:</b> 27.01.2022					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/HGV/21		<b>Course name:</b> Methods of human geographical research			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 <b>Per study period:</b> 42 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 3					
<b>Recommended semester/trimester of the course:</b> 6.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 25					
A	B	C	D	E	FX
76.0	8.0	16.0	0.0	0.0	0.0
<b>Provides:</b> Mgr. Marián Kulla, PhD., RNDr. Janetta Nestorová-Dická, PhD., univerzitná docentka, doc. Mgr. Ladislav Novotný, PhD., Mgr. Loránt Pregi, PhD.					
<b>Date of last modification:</b> 27.06.2022					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/FGV/21		<b>Course name:</b> Methods of physical geographical research			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 <b>Per study period:</b> 42 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 3					
<b>Recommended semester/trimester of the course:</b> 5.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 36					
A	B	C	D	E	FX
69.44	11.11	19.44	0.0	0.0	0.0
<b>Provides:</b> RNDr. Alena Gessert, PhD., univerzitná docentka, doc. Ing. Katarína Bónová, PhD., Mgr. Imrich Sládek, PhD.					
<b>Date of last modification:</b> 09.09.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚGE/MTK/21	<b>Course name:</b> Methods of thematic cartography
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 3	
<b>Recommended semester/trimester of the course:</b> 2.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> The evaluation is based on the submitted assignments from the exercises. Exercises are realized in the form of regular teaching, the introduction of the exercise is devoted to the theoretical basis, followed by the practical part of the exercise, which aims to work with spatial data in order to create a thematic map. During the semester, students will receive assignments aimed at creating a thematic map using selected methods of thematic cartography. Students submit assignments on an ongoing basis. Each assignment is evaluated separately. In order for the assignment to be accepted, it is necessary to obtain a minimum grade E from each assignment. The final evaluation is the average of the evaluation of individual assignments. Credits will be awarded only to a student who achieves a grade of at least E in the overall evaluation. Rating scale: A (100-91%), B (81-90%), C (71-80%), D (61-70 %), E (51-60%).	
<b>Learning outcomes:</b> Knowledge: The student will gain knowledge and skills from thematic cartography. They will get acquainted with the theoretical aspects of the content and principles of creating thematic maps. He will gain theoretical foundations and an overview of various aspects of thematic cartography, such as color theory in cartography, types of scales and division of the statistical file into intervals. They will get acquainted with the means of expression cartographic and methods of thematic cartography and gain an overview of the use of dynamic elements of cartographic visualization. Skills: The student will learn to create thematic maps using GIS professionally and cartographically correctly. Can evaluate the suitability of the cartographic method for the representation of various geographical phenomena and determine the optimal procedure for creating thematic maps. Competences: The student is able to evaluate the thematic maps and the suitability of the methods of thematic cartography with a high degree of independence. He will get acquainted with professional terminology in the field of thematic cartography of geodesy, which will enable him to communicate and collaborate with other experts in the field of geodesy, geoinformatics and cartography.	
<b>Brief outline of the course:</b> Exercises: Introduction to thematic cartography (content and types of thematic maps, phases and principles of creating thematic maps, compiling the content of the thematic map); Means of expression; Colors in maps; Scales (data evaluation, division of scales, creation of interval and	

functional scales, methods for plotting extremes in a statistical file); Legend of thematic maps; Point character method; Line character method; Area character method; Comma method; Isolinia method; Cartographs and cartograms method; Cartographic anamorphosis and cartotypogram method; methods for expressing the dynamics of spatial phenomena; Description in maps; composition of thematic maps; Geospatial data topology control and map generalization. Evaluation of maps and atlases; Animations, interactive maps and virtual reality in cartography.

**Recommended literature:**

VOŽENÍLEK, V. (2005). Cartography for GIS: geovisualization and map communication. Olomouc, Vydavatelství UP.

KRAAK, M.J., ORMELING, F. (2003). Cartography. Visualization of Geospatial Data. Harlow. Prentice Hall, Pearson Education.

PETERSON, M. P. ET AL. (1995). Interactive and Animated Cartography. Upper Saddle River Prentice Hall.

VOŽENÍLEK, V., KAŇOK, J. A KOL. (2012). Metody tematické kartografie: vizualizace prostorových informací. Olomouc, Univerzita Palackého v Olomouci.

SLOCUM, T.A. ET AL. (2002). Thematic Cartography and Visualization. Upper Saddle River, Pearson/Prentice Hall.

**Course language:**

**Notes:**

**Course assessment**

Total number of assessed students: 39

A	B	C	D	E	FX
38.46	41.03	12.82	5.13	0.0	2.56

**Provides:** Mgr. Jozef Šupinský, PhD., Mgr. Loránt Pregi, PhD.

**Date of last modification:** 27.06.2022

**Approved:** doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/MKR/21		<b>Course name:</b> Microgeography			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 3					
<b>Recommended semester/trimester of the course:</b> 6.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 33					
A	B	C	D	E	FX
51.52	39.39	6.06	3.03	0.0	0.0
<b>Provides:</b> Mgr. Imrich Sládek, PhD., doc. Mgr. Ladislav Novotný, PhD.					
<b>Date of last modification:</b> 05.09.2024					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/ NSGE/15		<b>Course name:</b> Mineral Resources - geological and environmental relations			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b> 6.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 159					
A	B	C	D	E	FX
40.25	24.53	23.27	9.43	0.63	1.89
<b>Provides:</b> doc. Ing. Katarína Bónová, PhD.					
<b>Date of last modification:</b> 30.09.2021					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ MTFM/20	<b>Course name:</b> Modern Trends in Physics
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 4.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> 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	
<b>Learning outcomes:</b> 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.	
<b>Brief outline of the course:</b> 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.	
<b>Recommended literature:</b> The literature is specified at the beginning of the semester according to selected topics.	
<b>Course language:</b> english	
<b>Notes:</b> Presence form represents a standart form for the course, if a need arises, the course is performed using MS Teams.	

<b>Course assessment</b>	
Total number of assessed students: 17	
abs	n
100.0	0.0
<b>Provides:</b> prof. RNDr. Peter Kollár, DrSc.	
<b>Date of last modification:</b> 22.11.2021	
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.	

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KPE/MMKV/17		<b>Course name:</b> Multiculturalism and Multicultural Education			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 4.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 294					
A	B	C	D	E	FX
40.14	43.54	14.97	0.68	0.34	0.34
<b>Provides:</b> PaedDr. Michal Novocký, PhD.					
<b>Date of last modification:</b> 22.09.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KPE/ Pg/15		<b>Course name:</b> Pedagogy			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 3.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 1345					
A	B	C	D	E	FX
21.64	30.48	23.57	13.68	8.4	2.23
<b>Provides:</b> PaedDr. Michal Novocký, PhD., doc. PaedDr. Renáta Orosová, PhD.					
<b>Date of last modification:</b> 22.09.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚGE/ EXF/21	<b>Course name:</b> Physical Geography Excursion
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> 6d <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 3	
<b>Recommended semester/trimester of the course:</b> 4.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b>	
<b>Learning outcomes:</b>	
<b>Brief outline of the course:</b>	
<b>Recommended literature:</b>	
<b>Course language:</b>	
<b>Notes:</b>	
<b>Course assessment</b> Total number of assessed students: 59	
abs	n
93.22	6.78
<b>Provides:</b> RNDr. Alena Gessert, PhD., univerzitná docentka, Mgr. Imrich Sládek, PhD.	
<b>Date of last modification:</b> 08.09.2025	
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.	

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/FGS1/21		<b>Course name:</b> Physical Geography of Slovakia			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 5					
<b>Recommended semester/trimester of the course:</b> 4.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 116					
A	B	C	D	E	FX
12.07	28.45	25.86	14.66	5.17	13.79
<b>Provides:</b> RNDr. Alena Gessert, PhD., univerzitná docentka, doc. Ing. Katarína Bónová, PhD., Mgr. Imrich Sládek, PhD., Mgr. Jozef Šupinský, PhD.					
<b>Date of last modification:</b> 08.09.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ ZFP1a/22	<b>Course name:</b> Physics Practical I
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 <b>Per study period:</b> 42 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 3	
<b>Recommended semester/trimester of the course:</b> 2.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Summary evaluation based on ongoing assessment: 1. Theoretical preparatory assignments (at least 50% of performance) 2. Group realization of experimental laboratory measurements, reporting their results in the protocol forms and their defense (at least 50% needed) 3. Active participation during group work in the classical or virtual laboratory (3 absences allowed) and during online learning (no absence, all individual theoretical assignments and laboratory protocols needed)	
<b>Learning outcomes:</b> Student should obtain and know to apply basic concepts and skills in 1. Designing and realizing classical and virtual physical experiments to improve or supplement new theoretical knowledge connected to introductory physics course: Mechanics & Molecular Physics. 2. Processing, visualizing, analyzing, evaluating and scientific presenting experimental data according to Guide to the Expression of Uncertainty in Measurement (GUM) and using modern digital technology (computer probes and simulations, Jupyter notebooks, Google spreadsheets).	
<b>Brief outline of the course:</b> 01.-02. Introduction, the concept of measurement error and uncertainty, new SI units, the basic task of the experimenter 03.-04. Processing direct measurements, type A uncertainties, data visualization using digital technologies 05.- 06. Processing indirect measurements, type B uncertainties, uncertainty budget for the experiment, data analysis using digital technologies, temple and contents of laboratory protocols 07.-09. Laboratory tasks: A. Measuring density of liquids and solids B. Measuring spherical radius and area C. Measuring moment of inertia 10. Defense of protocols 11.-13. Laboratory tasks: D. Measuring dynamic fluid viscosity	



E. Measuring state variables of thermal processes in air F. Measuring thermal capacity of solids 14. Defense of protocols, final evaluation					
<b>Recommended literature:</b> 1. RATCLIFFE, C.P. a RATCLIFFE, B., 2015. Doubt-Free Uncertainty In Measurement: An Introduction for Engineers and Students. London: Springer International Publishing. ISBN 978-3-319-12062-1. 2. DEGRO, J., JEŠKOVÁ, Z., ONDEROVÁ, Ľ. a KIREŠ, M., 2006. Základné fyzikálne praktikum I. Košice: Univerzita Pavla Jozefa Šafárika v Košiciach. ISBN 80-7097-649-7. 3. BUFFLER, A. ALLIE, S., LUBBEN F., CAMPBELL R., 2009. Introduction to Measurement in the Physics Laboratory: A probabilistic approach, University of York, York. 4. TAYLOR, J.R., 1997. Introduction To Error Analysis: The Study of Uncertainties in Physical Measurements. Sausalito CA: University Science Books. ISBN 978-0-935702-75-0.					
<b>Course language:</b> slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 53					
A	B	C	D	E	FX
41.51	28.3	7.55	13.21	9.43	0.0
<b>Provides:</b> doc. RNDr. Jozef Hanč, PhD.					
<b>Date of last modification:</b> 26.01.2022					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ ZFP1b/24	<b>Course name:</b> Physics Practical II
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 <b>Per study period:</b> 42 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 3	
<b>Recommended semester/trimester of the course:</b> 4.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> ÚFV/VF1b/24	
<b>Conditions for course completion:</b> 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.	
<b>Learning outcomes:</b> 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.	
<b>Brief outline of the course:</b> 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					
<b>Recommended literature:</b> 1. Tumanski S, Handbook of magnetic measurements, CRC press, 2011. 2. Fiorillo F, Characterization and Measurement of Magnetic Materials, Elsevier, 2004.					
<b>Course language:</b> english					
<b>Notes:</b> 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.					
<b>Course assessment</b> Total number of assessed students: 1					
A	B	C	D	E	FX
0.0	0.0	0.0	0.0	100.0	0.0
<b>Provides:</b> doc. RNDr. Adriana Zelenáková, DrSc., doc. RNDr. Ján Füzér, PhD.					
<b>Date of last modification:</b> 21.02.2024					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚFV/ ZFP1c/24		<b>Course name:</b> Physics Practical III			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 <b>Per study period:</b> 42 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 3					
<b>Recommended semester/trimester of the course:</b> 3.					
<b>Course level:</b> I.					
<b>Prerequisites:</b> ÚFV/VF1c/24					
<b>Conditions for course completion:</b> 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.					
<b>Learning outcomes:</b> 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.					
<b>Brief outline of the course:</b> 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.					
<b>Recommended literature:</b> 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 fyzikálních měření, SPN Praha, 1981.					
<b>Course language:</b> slovak, english					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 1					
A	B	C	D	E	FX
0.0	0.0	100.0	0.0	0.0	0.0
<b>Provides:</b> doc. RNDr. Marián Kireš, PhD., doc. RNDr. Ján Füzer, PhD.					
<b>Date of last modification:</b> 21.02.2024					

**Approved:** doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ ZFP1d/14	<b>Course name:</b> Physics Practical IV
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 <b>Per study period:</b> 42 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 3	
<b>Recommended semester/trimester of the course:</b> 5.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> - 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	
<b>Learning outcomes:</b> 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.	
<b>Brief outline of the course:</b> 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.	
<b>Recommended literature:</b> 1. J.Vrláková, S.Vokál: Základné fyzikálne praktikum III, skriptá PF UPJŠ, Košice, 2012, dostupné na <a href="http://www.upjs.sk/public/media/5596/Zakladne-fyzikalne-praktikum-III.pdf">http://www.upjs.sk/public/media/5596/Zakladne-fyzikalne-praktikum-III.pdf</a>	

<b>Course language:</b> slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 135					
A	B	C	D	E	FX
82.22	8.89	4.44	2.22	0.74	1.48
<b>Provides:</b> doc. RNDr. Janka Vrláková, PhD., doc. RNDr. Adela Kravčáková, PhD., RNDr. Dominika Švecová, RNDr. Zuzana Paulínyová, PhD.					
<b>Date of last modification:</b> 23.08.2022					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚFV/ FDE/15		<b>Course name:</b> Physics in Demonstration Experiments			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 3.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> Seminar work – a project dealing with hands-on experiments and their role in Physics teaching.					
<b>Learning outcomes:</b> The goal of the course is to get better the understanding of basic physical concepts and phenomena through demonstrational physical experiments.					
<b>Brief outline of the course:</b> 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.					
<b>Recommended literature:</b> 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					
<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 59					
A	B	C	D	E	FX
81.36	13.56	3.39	1.69	0.0	0.0
<b>Provides:</b> doc. RNDr. Marián Kireš, PhD.					
<b>Date of last modification:</b> 15.04.2022					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/ POL2/21		<b>Course name:</b> Political geography			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 1 / 2 <b>Per study period:</b> 14 / 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 5					
<b>Recommended semester/trimester of the course:</b> 6.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 25					
A	B	C	D	E	FX
24.0	48.0	24.0	4.0	0.0	0.0
<b>Provides:</b> RNDr. Stela Csachová, PhD., doc. Mgr. Ladislav Novotný, PhD.					
<b>Date of last modification:</b> 27.06.2022					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/ GOBY/21		<b>Course name:</b> Population Geography			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 2 <b>Per study period:</b> 28 / 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 5					
<b>Recommended semester/trimester of the course:</b> 2.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 156					
A	B	C	D	E	FX
5.77	7.05	26.92	32.69	21.15	6.41
<b>Provides:</b> doc. Mgr. Ladislav Novotný, PhD., RNDr. Janetta Nestorová-Dická, PhD., univerzitná docentka					
<b>Date of last modification:</b> 19.02.2024					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

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

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

**Brief outline of the course:**

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

**Recommended literature:**

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

**Course language:**

**Notes:**

**Course assessment**

Total number of assessed students: 522

A	B	C	D	E	FX
98.47	1.15	0.19	0.0	0.19	0.0

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

**Date of last modification:** 04.02.2025

**Approved:** doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KPPaPZ/Ps/15		<b>Course name:</b> Psychology			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 3.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 987					
A	B	C	D	E	FX
40.22	22.7	14.59	11.04	9.93	1.52
<b>Provides:</b> Mgr. Ondrej Kalina, PhD., Mgr. Lucia Barbierik, PhD.					
<b>Date of last modification:</b> 12.09.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

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

the connection of the curriculum with practice. Students will be expected to take an active approach in lectures and seminars with an emphasis on their independence and responsibility.					
<b>Brief outline of the course:</b> How to understand human behavior (overview of basic approaches in psychology); Basic overview of cognitive processes; Learning processes and their use in practice; Social influences, prosocial and antisocial behavior; How human emotions and motivations work; Deciding - why and when we take risks; Childhood experiences and their relationship to adulthood; Abnormal behavior, mental disorders and therapeutic approaches					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 254					
A	B	C	D	E	FX
46.46	23.23	24.41	4.33	1.18	0.39
<b>Provides:</b> Mgr. Ondrej Kalina, PhD.					
<b>Date of last modification:</b> 12.09.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ KVM/15	<b>Course name:</b> Quantum Mechanics I.
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 / 2 <b>Per study period:</b> 42 / 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 5	
<b>Recommended semester/trimester of the course:</b> 5.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> 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%).	
<b>Learning outcomes:</b> 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.	
<b>Brief outline of the course:</b> <ol style="list-style-type: none"> <li>1. Subject of study, experimental and theoretical foundations of quantum mechanics (QM).</li> <li>2. Wave formulation of QM. Postulate about wave function, superposition principle and postulate about operators.</li> <li>3. Eigenvalues and eigenfunctions of operators. Measurement of quantities and reduction of wave function.</li> <li>4. Time-independent and time-dependent Schrödinger equation. Ehrenfest equations and integrals of motion. A continuity equation.</li> <li>5. Matrix formulation of QM, Dirac symbolism, calculation of mean values and density matrix.</li> <li>6. Current immeasurability of physical quantities, Heisenberg uncertainty relations.</li> </ol>	



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. Philips, 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: 56

A	B	C	D	E	FX
23.21	23.21	23.21	16.07	7.14	7.14

**Provides:** doc. RNDr. Jozef Strečka, PhD., Mgr. Ing. Michal Nemčík

**Date of last modification:** 19.09.2021

**Approved:** doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/ RGE2/21		<b>Course name:</b> Regional Geography of Europe			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 / 1 <b>Per study period:</b> 42 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 5					
<b>Recommended semester/trimester of the course:</b> 6.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 73					
A	B	C	D	E	FX
5.48	15.07	36.99	34.25	4.11	4.11
<b>Provides:</b> RNDr. Stela Csachová, PhD., RNDr. Alena Gessert, PhD., univerzitná docentka, doc. Mgr. Ladislav Novotný, PhD., Mgr. Marián Kulla, PhD., Mgr. Imrich Sládek, PhD.					
<b>Date of last modification:</b> 08.09.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/ ADPZ/22		<b>Course name:</b> Remote sensing applications			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 1 / 2 <b>Per study period:</b> 14 / 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 3					
<b>Recommended semester/trimester of the course:</b> 5.					
<b>Course level:</b> I., II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 16					
A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0
<b>Provides:</b> prof. Mgr. Jaroslav Hofierka, PhD., Mgr. Katarína Onáčillová, PhD., Mgr. Ján Šášak, PhD.					
<b>Date of last modification:</b> 23.11.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KPE/ OLŠ/15		<b>Course name:</b> School Administration and Legislation			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 3., 5.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 357					
A	B	C	D	E	FX
45.66	31.65	13.17	5.88	3.08	0.56
<b>Provides:</b> PaedDr. Michal Novocký, PhD., Mgr. Beáta Galajda, PhD.					
<b>Date of last modification:</b> 22.09.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KF/VKFV/07		<b>Course name:</b> Selected Topics in Philosophy of Education (General Introduction)			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 3., 5.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 53					
A	B	C	D	E	FX
62.26	16.98	18.87	1.89	0.0	0.0
<b>Provides:</b> PhDr. Dušan Hruška, PhD.					
<b>Date of last modification:</b> 13.04.2022					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

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

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

**Course language:**

slovak

**Notes:**

**Course assessment**

Total number of assessed students: 2

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

**Provides:** PhDr. Janka Liptáková, PhD.

**Date of last modification:** 01.10.2025

**Approved:** doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚGE/ SHG/21	<b>Course name:</b> Seminar of human geography
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 3	
<b>Recommended semester/trimester of the course:</b> 6.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b>	
<b>Learning outcomes:</b>	
<b>Brief outline of the course:</b>	
<b>Recommended literature:</b>	
<b>Course language:</b>	
<b>Notes:</b>	
<b>Course assessment</b> Total number of assessed students: 14	
abs	n
92.86	7.14
<b>Provides:</b> Mgr. Marián Kulla, PhD., RNDr. Janetta Nestorová-Dická, PhD., univerzitná docentka, doc. Mgr. Ladislav Novotný, PhD., Mgr. Loránt Pregi, PhD.	
<b>Date of last modification:</b> 27.06.2022	
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.	



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚGE/ SFG/21	<b>Course name:</b> Seminar of physical geography
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 3	
<b>Recommended semester/trimester of the course:</b> 6.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b>	
<b>Learning outcomes:</b>	
<b>Brief outline of the course:</b>	
<b>Recommended literature:</b>	
<b>Course language:</b>	
<b>Notes:</b>	
<b>Course assessment</b> Total number of assessed students: 5	
abs	n
100.0	0.0
<b>Provides:</b> doc. Ing. Katarína Bónová, PhD., RNDr. Alena Gessert, PhD., univerzitná docentka, Mgr. Imrich Sládek, PhD., Mgr. Jozef Šupinský, PhD.	
<b>Date of last modification:</b> 27.06.2022	
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.	

## COURSE INFORMATION LETTER

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

<b>Course assessment</b>					
Total number of assessed students: 241					
A	B	C	D	E	FX
63.07	20.33	9.96	4.15	1.24	1.24
<b>Provides:</b> Mgr. Ján Ruman, PhD.					
<b>Date of last modification:</b> 20.08.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚFV/TRS/03		<b>Course name:</b> Special Theory of Relativity			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b> 5.					
<b>Course level:</b> I., II.					
<b>Prerequisites:</b> ÚFV/TEP1/03					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 189					
A	B	C	D	E	FX
49.21	21.16	15.34	7.94	6.35	0.0
<b>Provides:</b> RNDr. Tomáš Lučivjanský, PhD., univerzitný docent					
<b>Date of last modification:</b> 06.03.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

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

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

**Course language:**  
 Slovak language

**Notes:**

**Course assessment**

Total number of assessed students: 15804

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
85.76	0.06	0.0	0.0	0.0	0.04	8.99	5.14

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

**Date of last modification:** 07.02.2024

**Approved:** doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.

## COURSE INFORMATION LETTER

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

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

**Course language:**  
 Slovak language

**Notes:**

**Course assessment**

Total number of assessed students: 14278

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
83.63	0.48	0.01	0.0	0.0	0.04	11.5	4.34

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

**Date of last modification:** 07.02.2024

**Approved:** doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.



## COURSE INFORMATION LETTER

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

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

**Course language:**

Slovak language

**Notes:**

**Course assessment**

Total number of assessed students: 9347

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
87.97	0.06	0.01	0.0	0.0	0.02	4.91	7.02

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

**Date of last modification:** 07.02.2024

**Approved:** doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.

## COURSE INFORMATION LETTER

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

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

**Course language:**  
 Slovak language

**Notes:**

**Course assessment**

Total number of assessed students: 6037

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
82.18	0.27	0.03	0.0	0.0	0.0	8.7	8.83

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

**Date of last modification:** 07.02.2024

**Approved:** doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚGE/STMG/21		<b>Course name:</b> Statistical Methods in Geography			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 1 / 2 <b>Per study period:</b> 14 / 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 3					
<b>Recommended semester/trimester of the course:</b> 2.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 151					
A	B	C	D	E	FX
23.18	18.54	20.53	14.57	21.85	1.32
<b>Provides:</b> prof. Mgr. Jaroslav Hofierka, PhD., RNDr. Janetta Nestorová-Dická, PhD., univerzitná docentka					
<b>Date of last modification:</b> 12.02.2023					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ SVL1/03	<b>Course name:</b> Structure and Properties of Solids
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 <b>Per study period:</b> 42 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 5	
<b>Recommended semester/trimester of the course:</b> 5.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> 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%)	
<b>Learning outcomes:</b> 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.	
<b>Brief outline of the course:</b> 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.	
<b>Recommended literature:</b> 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](http://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: 57

A	B	C	D	E	FX
36.84	24.56	21.05	10.53	5.26	1.75

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

**Date of last modification:** 21.09.2021

**Approved:** doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ SVKD/04	<b>Course name:</b> Student Scientific Conference
<b>Course type, scope and the method:</b> <b>Course type:</b> <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 4	
<b>Recommended semester/trimester of the course:</b>	
<b>Course level:</b> I., II.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> presentation of results of studnets' research work at Students' scientific conference	
<b>Learning outcomes:</b> Student gains experience and skills in processing and presentation of results of his research work.	
<b>Brief outline of the course:</b> Presentation of results of studnets' research work at Students' scientific conference.	
<b>Recommended literature:</b> Based on the recommendations of supervisor	
<b>Course language:</b> Slovak	
<b>Notes:</b>	
<b>Course assessment</b> Total number of assessed students: 10	
abs	n
100.0	0.0
<b>Provides:</b>	
<b>Date of last modification:</b> 03.05.2015	
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.	



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚGE/ SVG/04	<b>Course name:</b> Student Scientific Conference in Geography
<b>Course type, scope and the method:</b> <b>Course type:</b> <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 4	
<b>Recommended semester/trimester of the course:</b>	
<b>Course level:</b> I., II.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b>	
<b>Learning outcomes:</b>	
<b>Brief outline of the course:</b> After choosing a topic suggested by supervisors implying a geographical problem, the students will work on the topic, write a thesis and defense it before the committee.	
<b>Recommended literature:</b>	
<b>Course language:</b>	
<b>Notes:</b>	
<b>Course assessment</b> Total number of assessed students: 15	
abs	n
100.0	0.0
<b>Provides:</b> RNDr. Alena Gessert, PhD., univerzitná docentka, RNDr. Janetta Nestorová-Dická, PhD., univerzitná docentka, Mgr. Marián Kulla, PhD., doc. Ing. Katarína Bónová, PhD., RNDr. Stela Csachová, PhD.	
<b>Date of last modification:</b> 01.12.2021	
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.	

## COURSE INFORMATION LETTER

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

<ul style="list-style-type: none"> <li>- collaborative interactive whiteboards (Jamboard, Whiteboard)</li> <li>- online presentations and online meetings (Google presentations, Powerpoint, Google meet, Microsoft teams)</li> </ul>					
<b>Recommended literature:</b> <ol style="list-style-type: none"> <li>1. Carretero Gomez, S., Vuorikari, R. and Punie, Y., DigComp 2.1: The Digital Competence Framework for Citizens with eight proficiency levels and examples of use, Luxembourg, 2017, ISBN 978-92-79-68006-9, <a href="https://www.ecdl.sk/">https://www.ecdl.sk/</a></li> <li>2. Bruff, D. (2019). Intentional Tech: Principles to Guide the Use of Educational Technology in College Teaching (1st edition). Morgantown: West Virginia University Press.</li> <li>3. Baker, Y. (2020). Microsoft Teams for Education. Amazon Digital Services.</li> <li>4. Miller, H. (2021). Google Classroom + Google Apps: 2021 Edition. Brentford: Orion Edition Limited.</li> </ol>					
<b>Course language:</b> slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 254					
A	B	C	D	E	FX
75.98	5.12	3.54	0.0	14.57	0.79
<b>Provides:</b> doc. RNDr. Jozef Hanč, PhD.					
<b>Date of last modification:</b> 26.01.2022					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

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

11. Capsizing 12. Commands	
<b>Recommended literature:</b> 1. JUNGER, J. et al. Turistika a športy v prírode. Prešov: FHPV PU v Prešove. 2002. ISBN 8080680973. Internetové zdroje: 1. STEJSKAL, T. Vodná turistika. Prešov: PU v Prešove. 1999. Dostupné na: <a href="https://ulozto.sk/tamhle/UkyxQ2lYF8qh/name/Nahrane-7-5-2021-v-14-46-39#!ZGDjBGR2AQtkAzVkAzLkLJWuLwWxZ2ukBRLjnGqSomICMmOyZN==">https://ulozto.sk/tamhle/UkyxQ2lYF8qh/name/Nahrane-7-5-2021-v-14-46-39#!ZGDjBGR2AQtkAzVkAzLkLJWuLwWxZ2ukBRLjnGqSomICMmOyZN==</a>	
<b>Course language:</b> Slovak language	
<b>Notes:</b>	
<b>Course assessment</b> Total number of assessed students: 252	
abs	n
36.11	63.89
<b>Provides:</b> Mgr. Dávid Kaško, PhD.	
<b>Date of last modification:</b> 29.03.2022	
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.	

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KPE/SSU/15		<b>Course name:</b> Teachers' Support Groups			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 6.					
<b>Course level:</b> I., II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 91					
A	B	C	D	E	FX
87.91	6.59	4.4	0.0	0.0	1.1
<b>Provides:</b> doc. PaedDr. Renáta Orosová, PhD.					
<b>Date of last modification:</b> 22.09.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

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

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ TMEU/15	<b>Course name:</b> Theoretical Mechanics
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 3	
<b>Recommended semester/trimester of the course:</b> 3.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> ÚFV/VF1a/12	
<b>Conditions for course completion:</b> 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.	
<b>Learning outcomes:</b> 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.	
<b>Brief outline of the course:</b> 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.					
<b>Recommended literature:</b> 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.					
<b>Course language:</b> Slovak, English					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 62					
A	B	C	D	E	FX
46.77	6.45	17.74	19.35	4.84	4.84
<b>Provides:</b> prof. RNDr. Michal Jaščur, CSc.					
<b>Date of last modification:</b> 20.09.2021					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KPE/TVE/08		<b>Course name:</b> Theory of Education			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 4., 6.					
<b>Course level:</b> I.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 725					
A	B	C	D	E	FX
46.07	29.66	15.86	4.83	1.79	1.79
<b>Provides:</b> Mgr. Beáta Galajda, PhD., Mgr. Zuzana Vagaská, PhD.					
<b>Date of last modification:</b> 22.09.2025					
<b>Approved:</b> doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/TEP1/03	<b>Course name:</b> Theory of the Electromagnetic Field
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 / 1 <b>Per study period:</b> 42 / 14 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 5	
<b>Recommended semester/trimester of the course:</b> 4.	
<b>Course level:</b> I.	
<b>Prerequisites:</b> ÚFV/VFM1b/15 or ÚFV/VF1b/24 or ÚFV/VF1b/03	
<b>Conditions for course completion:</b> 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%).	
<b>Learning outcomes:</b> 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.	
<b>Brief outline of the course:</b> 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: 363

A	B	C	D	E	FX
25.9	8.54	19.28	20.66	17.63	7.99

**Provides:** doc. RNDr. Jozef Strečka, PhD., Mgr. Ing. Michal Nemčík

**Date of last modification:** 19.09.2021

**Approved:** doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚFV/ TSF/17	<b>Course name:</b> Thermodynamics and Statistical physics
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 / 2 <b>Per study period:</b> 42 / 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 5	
<b>Recommended semester/trimester of the course:</b> 6.	
<b>Course level:</b> I.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> To successfully complete the course, the student must demonstrate sufficient understanding of all the basic concepts and applications of thermodynamics and classical statistical physics within the syllabus of the course. Knowledge of basic concepts of thermodynamics and classical statistical physics at the level of their mathematical definition, as well as their physical content and principled applications is required. 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 during exercises and for independent homework. In addition to direct participation in lectures, the student is obliged to study within the self-study professional topics assigned by the teacher and also to develop and present two homework assignments. The condition for obtaining credits is, in addition to participation in lectures, also the successful completion of three 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.	
<b>Learning outcomes:</b> After completing lectures and exercises, the student will acquire fundamental knowledge and skills in thermodynamics and classical statistical physics, which are prerequisites for completing advanced courses in quantum statistical physics, computer physics and condensed matter theory at the master's courses. The graduate of this course masters sufficient physical knowledge and mathematical apparatus to independently solve a wide range of current scientific problems in various fields of classical physics. These are mainly practical applications to systems consisting of a huge number of interacting particles described by the equations of classical physics. The graduate is able to apply the acquired knowledge in the field of life sciences (e.g. the spread of dangerous infectious diseases), but also in the field of big data processing and in the social and political sciences (e.g. prediction of election results).	
<b>Brief outline of the course:</b> 1. Historical introduction and basic concepts of thermodynamics. Macroscopic system and macroscopic parameters. Internal, external, extensive and intensive macroscopic parameters. State	

of system, state parameters and status functions. Basic division of thermodynamic systems - isolated, closed and open systems. Homogeneous and heterogeneous systems, thermally homogeneous system. State of thermodynamic equilibrium. The first postulate of thermodynamics, transitivity and the principle of spontaneous invariability of the equilibrium state.

2. The second postulate of thermodynamics and thermodynamic temperature. Natural, reversible, irreversible and quasi-static processes in thermodynamics. Internal energy, work and heat in thermodynamics. Thermal and caloric equation of state. The first law of thermodynamics. Heat capacity, specific and latent heat. Isothermal, isochoric, isobaric, adiabatic and polytropic processes in thermodynamics and their description.

3. Pfaff differential form, integrating factor, complete differential and their use in thermodynamics. Basic formulations of the second law of thermodynamics. Caratheodory's principle and mathematical formulation of the second law of thermodynamics for quasi-static processes. Introduction of absolute temperature and entropy in thermodynamics.

4. Relationship between thermodynamic and absolute temperature. Entropy and Clausius equation for reversible processes. Thermodynamic potentials for quasi-static processes. Maxwell's relations. The third law of thermodynamics. Unattainability of absolute zero temperature.

5. Dependence of thermodynamic quantities on the mass of the number of particles. Euler's theorem for homogeneous functions and its application. Thermodynamic potentials for systems with variable particle number. Non-static processes and nonequilibrium states. Slow and fast non-static processes. Mathematical formulation of the second law of thermodynamics for non-static processes. Clausius inequality.

6. Thermodynamic potentials of nonequilibrium systems and equilibrium conditions. Maximum work done by the body in the external environment. Heterogeneous systems. Gibbs phase rule.

7. Phase space, configuration space and impulse space. Statistical ensemble and distribution function. Stationary ensemble. Canonical invariance of phase volume. Calculation of mean values of physical quantities in classical statistical physics.

8. Microcanonical, canonical and grand canonical ensembles in classical statistical physics. Canonical and grand canonical partition function, internal energy, entropy, free energy and grand canonical potential.

9. Equipartition and virial theorems. Calculation of ideal gas entropy in a microcanonical ensemble, Gibbs paradox.

10. The ideal gas in the canonical ensemble and the classical theory of paramagnetism. Classical theory of heat capacity - Dulong's-Petit's law.

#### **Recommended literature:**

- 1) J. Kvasnica, Termodynamika, SNTL, Praha (1965).
- 2) J. Kvasnica, Statistická fyzika, ACADEMIA, Praha (1983).
- 3) M. Varady, Statistická fyzika, UJEP Ústí nad Labem, 2007.
- 4) M. Jaščur, M. Hnatič, Úvod do termodynamiky, Univerzita P.J. Šafárika, Košice (2013).

#### **Course language:**

#### **Notes:**

#### **Course assessment**

Total number of assessed students: 49

A	B	C	D	E	FX
34.69	14.29	44.9	4.08	2.04	0.0

**Provides:** prof. RNDr. Michal Jaščur, CSc.

**Date of last modification:** 06.11.2021

**Approved:** doc. RNDr. Zuzana Ješková, PhD., prof. Mgr. Jaroslav Hofierka, PhD.