CONTENT

COURSE INFORMATION LETTER

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

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

Number of ECTS credits: 2

Recommended semester/trimester of the course:

Course level: I., II., N

Prerequisities:

Conditions for course completion:
Active classroom participation, assignments handed in on time, 2 absences tolerated
1 test (10th week), no retake.
Presentation on chosen topic
Final evaluation- average assessment of test (40%), essay (30%) and presentation (30%).
Grading scale: A 93-100%, B 86-92%, C 79-85%, D 72-78%, E 65-71%, FX 64% and less

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

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

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

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

Notes:

Course assessment
Total number of assessed students: 400

A	B	C	D	E	FX
34.75	22.0	15.75	9.5	6.25	11.75

Provides: Mgr. Viktória Mária Slovenská

Date of last modification: 19.09.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ALGa/10	**Course name:** Algebra I

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

Number of ECTS credits: 7

Recommended semester/trimester of the course: 1.

Course level: I.

Prerequisities:

Conditions for course completion:
According to the results from the semester and in view of the results of the written and oral final exam..

Learning outcomes:
To acquire the methods of mathematical thinking and cognition. Gain basic knowledge of number theory related to divisibility, master the basic concepts of linear algebra and be able to apply them to specific problems and mathematical problems.

Brief outline of the course:
Divisibility in Z. Fields. Systems of linear equations, Gauss elimination. Maps, permutations. Computing with matrices. Determinants, Cramer rule.

Recommended literature:
T. Katriňák a kol.: Algebra a teoretická aritmetika 1, Alfa Bratislava, 1985.
T.S Blyth, E.F. Robertson: Basic linear algebra, Springer Verlag, 2001.
K. Jänich: Linear algebra, Springer Verlag, 1991.

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 1369

A	B	C	D	E	FX
11.91	11.83	18.99	18.41	28.12	10.74

Provides: prof. RNDr. Danica Studenovská, CSc., RNDr. Igor Fabrici, Dr. rer. nat., RNDr. Lucia Janičková, PhD., Mgr. Ivana Varga

Date of last modification: 16.04.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ ALG2b/10	**Course name:** Algebra II

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 4 / 2 **Per study period:** 56 / 28
Course method: present

Number of ECTS credits: 7

Recommended semester/trimester of the course: 2.

Course level: I.

Prerequisities: ÚMV/ALGa/10

Conditions for course completion:
According to tests and to the exam.

Learning outcomes:
To acquire the methods of mathematical thinking and cognition. To deepen and expand students' knowledge of systems of linear equations, to acquire basic knowledge about vector spaces, linear representations, polynomials and polynomial equations.

Brief outline of the course:
Linear spaces, bases. Rank of a matrix. Systems of homogeneous linear equations.
Linear transformations.
Ring, fields. Polynomials over a field. Factorization into irreducible factors, roots. Roots of complex numbers. Cubic equations.
Polynomials with several unknowns, symmetric polynomials.

Recommended literature:
A. Kurosh: Higher Algebra, Mir Publishers, 1975.

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 221

A	B	C	D	E	FX
22.62	17.19	16.74	14.03	25.34	4.07

Provides: prof. RNDr. Danica Studenovská, CSc., RNDr. Lucia Janičková, PhD.

Date of last modification: 24.11.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ ATC/10	**Course name:** Algebra and number theory

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

Number of ECTS credits: 4

Recommended semester/trimester of the course: 4.

Course level: I.

Prerequisities: ÚMV/ALG2b/10

Conditions for course completion:
It is based on the results of written checks carried out during the semester. Final evaluation is based on the results of written checks carried out during the semester, of test, written and oral exam.

Learning outcomes:
Obtain basic knowledge about groups and from the elementary number theory.

Brief outline of the course:
Groups, subgroups, quotient groups, homomorphism theorems for groups, selected topics of the number theory.

Recommended literature:
G.Birkoff, S.Mac Lane: A Survey of Modern Algebra, New York 1965
I.R. Shafarevich: Basic Notions of Algebra, Springer, 2005

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 196

A	B	C	D	E	FX
13.78	20.41	26.02	21.94	14.8	3.06

Provides: doc. RNDr. Miroslav Ploščica, CSc.

Date of last modification: 08.02.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: KPE/ ALP/06	**Course name:** Alternative Education

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 4.

Course level: I.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 318

A	B	C	D	E	FX
69.18	25.16	2.83	0.63	0.31	1.89

Provides: Mgr. Katarína Petríková, PhD.

Date of last modification: 20.06.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/APM/19	**Course name:** Applications of mathematics

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 6.

Course level: I.

Prerequisities:

Conditions for course completion:
Presentation on the chosen topic during the seminar.

Learning outcomes:
Students get an overview of applications of mathematics and its tools in various areas of human activity.

Brief outline of the course:
1. Applications of graphs in analysis of complex networks, their central actors and their community structure.
2. Statistical methods used in shape recognition (geometric morphometrics, principal component analysis, linear regression) with application in the analysis of dinosaur skulls and other examples of the use of shape recognition in practice.

Recommended literature:
1. E. A. Robinson, D. H. Ullmann: A mathematical look at politics, CRC Press, 2010.
2. U. Brandes, T. Erlebach: Network Analysis: Methodological Foundations (Lecture Notes in Computer Science, 3418), 2005.
3. Karchynskaya, V., Kopčáková, J., Klein, D., Gába, A., Madarasová-Gecková, A., van Dijk, J. P., de Winter, A. F. a Reijneveld, S. A. (2020). Is BMI a Valid Indicator of Overweight and Obesity for Adolescents? Int. J. Environ. Res. Public Health, 17, 4815.

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 19

A	B	C	D	E	FX
78.95	21.05	0.0	0.0	0.0	0.0

Provides: RNDr. Andrej Gajdoš, PhD., doc. Mgr. Jozef Kiseľák, PhD., doc. RNDr. Daniel Klein, PhD., prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Katarína Cechlárová, DrSc.

Date of last modification: 25.08.2022
Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ AFJ1a/15	**Course name:** Automata and formal languages

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

Number of ECTS credits: 4

Recommended semester/trimester of the course:

Course level: I., N

Prerequisities:

Conditions for course completion:
Oral examination.

Learning outcomes:
To provide theoretical background for studying computer science in general, by giving the necessary knowledge in theory of automata.

Brief outline of the course:
1: Chomsky hierarchy of grammars: alphabet, symbol (letter, character), transitive closure, word (string), empty word (empty string), length of a string, concatenation, language, grammar, nonterminal symbol, terminal symbol, initial nonterminal (initial symbol), grammar rule, derivation step, language generated by a grammar, Chomsky hierarchy of grammars - phrase-structure, context sensitive, context free, regular
2: Deterministic finite state automata: finite state automaton, state, input symbol, output symbol, initial state, transition function, output function, examples of automata and their graphic representation, generalized transition and output functions and their basic properties
3: Reduction of automata I: equivalent automata, minimal (optimal) automaton, reachable state, properties of reachable states, elimination of unreachable states
4: Reduction of automata II: equivalent states, k-equivalent states, properties of equivalence and k-equivalence, relation between k-equivalence and (k+1)-equivalence, partitioning the state set into equivalence classes, elimination of equivalent states
5: Reduction of automata III: proof of correctness, unambiguity, and optimality of reduced automaton, testing equivalence of two automata
6: Deterministic finite state acceptors: basic definitions, language recognized by a finite state acceptor, common properties of acceptors and automata with an output, minimizing a finite state acceptor
7: Operations with regular languages: complement, intersection, union, difference, symmetric difference, testing of emptiness, inclusion, equality, and disjointness for regular languages
8: Nondeterministic finite state acceptors: definition, transition function, language recognized by a nondeterministic acceptor, elimination of nondeterminism
9: epsilon-acceptors: definition, properties, elimination of epsilon-transitions

10: Regular grammars: regular grammar, extended regular grammar, transformation of acceptor to a regular grammar, transformation of extended regular grammar to an epsilon-acceptor
11: Regular expressions I: basic properties, transformation of regular expression to an epsilon-acceptor
12: Regular expressions II: regular equations, valid algebraic manipulations with regular expressions, solving an equation with a single unknown variable, solving a system of regular equations, transformation of acceptor to a regular expression
13: Another constructions: review of transformations among various representations, an example of a direct transformation of a grammar to a regular expression, closure of the class of regular languages under another language operations – concatenation and Kleene star, mirror image
14: Another operations: homomorphism and inverse homomorphism, a context-free language that is not regular

Recommended literature:

J.E. Hopcroft, R.Motwani, J.D. Ullman: Introduction to automata theory, languages, and computation, Addison-Wesley, 2001.
J. Shallit: A second course in formal languages and automata theory, Cambridge University press, 2009.
M. Sipser: Introduction to the theory of computation, Thomson Course Technology, 2006.

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 895

A	B	C	D	E	FX
26.59	18.21	23.46	17.09	9.83	4.8

Provides: prof. RNDr. Viliam Geffert, DrSc., RNDr. Dominika Pališínová, RNDr. Juraj Šebej, PhD.

Date of last modification: 23.11.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ BKP2/14	**Course name:** Bachelor Project

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

Number of ECTS credits: 4

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities:

Conditions for course completion:
FInalization and submission of the bachelor project based on the assignments of the supervisor and acceptance of its content by the supervisor.

Learning outcomes:
Finished bachelor project prepared as a design of a bachelor thesis, as an evidence that student is able to process konwledge available in different resources, citate correctly and keep the layout correctly, prepare a presentation and share the results in front of experts.

Brief outline of the course:
Using the created structure and partial work on the bachelor project, the student implements the second (finalization) phase of elaboration of the bachelor thesis based on the following activities: finalizes the project into a thesis in required formal and technical forms with correct citations of bibliographic references, implements the principles of presentation and reporting the work and its results.

Recommended literature:
1. Resources (literature, papers) based on the project assignments.
2. Regulations No. 1/2011 about final works (thesis for University of P.J. Safarik.

Course language:
Slovak, English

Notes:

Course assessment
Total number of assessed students: 12

abs	n
100.0	0.0

Provides:

Date of last modification: 31.01.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ BSSM/15	**Course name:** Bachelor State Exam Physics

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

Number of ECTS credits: 1

Recommended semester/trimester of the course:

Course level: I.

Prerequisities:

Conditions for course completion:
Answering questions concerning selected fields of the subjects of Bachelor state exam.

Learning outcomes:
Basic knowledge and overview of konowledge in the fields stated by the Bachelro state exam.

Brief outline of the course:
Exam in the field of knowledge in physics consisting of an overview of the following fields:
- Mechanics and molecular physics
- Electricity and magnetism
- Oscillations and waves, optics
- Nuclear physics
- General biophysics
- Theoretical mechanics
- Theory of electromagnetic field
- Statistical physics

Recommended literature:

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 29

A	B	C	D	E	FX
41.38	31.03	17.24	0.0	6.9	3.45

Provides:

Date of last modification: 16.02.2016

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

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

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

Number of ECTS credits: 4

Recommended semester/trimester of the course:

Course level: I.

Prerequisities:

Conditions for course completion:
Required number of credits gained basedon submitting the bachelor thesis.

Learning outcomes:

Brief outline of the course:
Presentation of the bachelor thesis results, answering questions of the reviewer and members of professional commission.

Recommended literature:

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 61

A	B	C	D	E	FX
86.89	8.2	3.28	1.64	0.0	0.0

Provides:

Date of last modification: 07.12.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ BKP2/14	**Course name:** Bachelor project

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities:

Conditions for course completion:
To prepare and present a contribution related to thesis and its topic.

Learning outcomes:
To get students familiar with basic knowledge on the form and content of thesis and thesis presentation as well as with the support for its realisation.

Brief outline of the course:
Necessary elements and formal aspects of a thesis. WYSIWYG editors, LaTeX, drawing programs. Presentation software, Microsoft PowerPoint and its clones, Beamer. Suggestions for presentation and contribution making.

Recommended literature:
electronic information sources

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 141

abs	n
100.0	0.0

Provides: doc. RNDr. Dušan Šveda, CSc.

Date of last modification: 03.05.2015

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚMV/ BPO/14	**Course name:** Bachelor thesis and its defence

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

Number of ECTS credits: 4

Recommended semester/trimester of the course:

Course level: I.

Prerequisities:

Conditions for course completion:
The bachelor thesis is the result of the student's own work. It must not show elements of academic fraud and must meet the criteria of good research practice defined in the Rector's Decision no. 21/2021, which lays down the rules for assessing plagiarism at Pavol Jozef Šafárik University in Košice and its components. Fulfillment of the criteria is verified mainly in the supervision process and in the process of thesis defense. Failure to do so is reason for disciplinary action.

Learning outcomes:
Evaluation of student‘s competences with respect to the profile of the graduate.The bachelor's thesis demonstrates mastery of the basics of theory and professional terminology of the field of study, acquisition of knowledge, skills and competencies in accordance with the declared profile of the graduate of the study program, as well as the ability to apply them creatively in solving selected field problems. The bachelor thesis may have elements of compilation. The student demonstrates the ability of independent professional work in terms of content, formal and ethical. Further details on the bachelor thesis are determined by Directive no. 1/2011 on the basic requirements of final theses and the Study Regulations of UPJŠ in Košice.

Brief outline of the course:
1. Elaboration of the bachelor thesis in accordance with the instructions of the supervisor.
2. Presentation of the results of the bachelor's thesis before the examination commission.
3. Answering questions related to the topic of the bachelor thesis within the discussion.

Recommended literature:
The recommended literature is determined individually in accordance with the topic of the bachelor's thesis.

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 178

A	B	C	D	E	FX
68.54	17.98	6.74	3.93	2.25	0.56

Provides:

Date of last modification: 19.04.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚBEV/ BDD/05	**Course name:** Biology of Children and Adolescents

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 0 **Per study period:** 28 / 0
Course method: present

Number of ECTS credits: 2

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

Course level: I.

Prerequisities:

Conditions for course completion:
Written test

Learning outcomes:
Acquisition of basic morphological and physiological knowledge about individual organs and systems of the human body with a focus on the specifics of childhood and adolescence. Familiarity with developmental and growth characteristics and with the most common diseases in these stages of ontogenesis.

Brief outline of the course:
Human ontogenesis. Postnatal development. Age specific features of skeletal and muscalar, circulatory, respiratory, gastrointestinal and urinary systems. Reproductive system. Endocrine system. Nervous system. Age specifics of selected diseases and drug dependence arise. Human population and environment.

Recommended literature:
Drobný I., Drobná M.: Biológia dieťaťa pre špeciálnych pedagógov I. a II. Bratislava, PdF UK, 2000
Lipková V.: Somatický a fyziologický vývoj dieťaťa. Osveta Bratislava, 1980
Malá H., Klementa J.: Biológia detí a dorastu. Bratislava, SPN, 1989

Course language:

Notes:

Course assessment
Total number of assessed students: 1717

A	B	C	D	E	FX
31.74	23.76	17.94	16.83	9.2	0.52

Provides: doc. RNDr. Monika Kassayová, CSc.

Date of last modification: 20.04.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ ZBR/14	**Course name:** Bridge fundamentals

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities:

Conditions for course completion:
Active participation on exercises.

Learning outcomes:
A student gets acquainted with fundamentals of the contract bridge, develops his/her logical thinking and consolidates his/her habits of positive social behaviour.

Brief outline of the course:
Bridge rules.
Principles of the bidding system Standard American.
Basic techniques of declarer's play.
Basic techniques of the defence.
Lead conventions, signals.
Common bidding conventions.
Selected advanced techniques of the card play.
Partnership cooperation in the contract bridge.
Bridge ethics.

Recommended literature:
T. Menyhért: Kurz bridžu 2013, http://new.bridgekosice.sk/kurz-bridzu-2013/
R. Pavlicek: Learn To Play Bridge!, http://www.rpbridge.net/1a00.htm
ACBL SAYC System Booklet, http://ebookbrowsee.net/acbl-sayc-pdf-d201415187

Course language:
Slovak or English

Notes:
Minimum number of participants is 4.

Course assessment
Total number of assessed students: 26

abs	n
96.15	3.85

Provides: doc. RNDr. Miroslav Ploščica, CSc., prof. RNDr. Mirko Horňák, CSc.
Date of last modification: 08.02.2022
Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: KOP/ OPaPDV/14	**Course name:** Civil Law and Intellectual Property Rights
Course type, scope and the method: **Course type:** Lecture **Recommended course-load (hours):** **Per week:** 2 **Per study period:** 28 **Course method:** present	
Number of ECTS credits: 4	
Recommended semester/trimester of the course: 3., 5.	
Course level: I., N	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 113	

abs	n
93.81	6.19

Provides: doc. JUDr. Renáta Bačárová, PhD., LL.M., prof. JUDr. Peter Vojčík, CSc.
Date of last modification: 23.09.2021
Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: CJP/ PFAJKKA/07	**Course name:** Communicative Competence in English

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

Number of ECTS credits: 2

Recommended semester/trimester of the course:

Course level: I., II., N

Prerequisities:

Conditions for course completion:
Active participation in class and completed homework assignments. Students are allowed to miss two classes at the most.
2 credit tests (presumably in weeks 6/7 and 12/13) and an oral presentation in English.
Final evaluation consists of the scores obtained for the 2 tests (50%) and the presentation (50%).
Final grade will be calculated as follows: A 93-100 %, B 86-92%, C 79-85%, D 72-78%, E 65-71%, FX 64 % and less.

Learning outcomes:

Brief outline of the course:

Recommended literature:
www.bbclearningenglish.com
Štěpánek, Libor a kol. Academic English-Akademická angličtina. Praha: Grada Publishing, a.s., 2011.
McCarthy M., O'Dell F.: English Vocabulary in Use, Upper-Intermediate. CUP, 1994.
Fictumova J., Ceccarelli J., Long T.: Angličtina, konverzace pro pokročilé. Barrister and Principal, 2008.
Peters S., Gráf T.: Time to practise. Polyglot, 2007.
Jones L.: Communicative Grammar Practice. CUP, 1985.

Course language:
English language, B2 level according to CEFR

Notes:

Course assessment
Total number of assessed students: 289

A	B	C	D	E	FX
44.64	20.76	17.65	7.96	6.23	2.77

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

Date of last modification: 12.02.2023

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: CJP/ PFAJGA/07	**Course name:** Communicative Grammar in English

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

Number of ECTS credits: 2

Recommended semester/trimester of the course:

Course level: I., II., N

Prerequisities:

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

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

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

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

Course language:

English language, level B2 according to CEFR.

Notes:

Course assessment
Total number of assessed students: 432

A	B	C	D	E	FX
39.81	19.91	16.2	8.1	5.79	10.19

Provides: Mgr. Lenka Klimčáková

Date of last modification: 13.09.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: KGER/ NJKG/07	**Course name:** Communicative Grammar in German Language

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

Number of ECTS credits: 2

Recommended semester/trimester of the course:

Course level: I., II.

Prerequisities:

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

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

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

Recommended literature:
Dreyer, H. – Schmitt, R.: Lehr- und Übungsbuch der deutschen Grammatik. Hueber Verlag GmbH & Co. Ismaning, 2009.
Krüger, M.: Motive Kursbuch, Lektion 1 – 30. Huebert Verlag GmbH & Co. Ismaning, 2020.
Brill, L.M. – Techmer, M.: Deutsch. Großes Übungsbuch. Wortschatz. Huebert Verlag GmbH & Co. Ismaning, 2011.
Földeak, Hans: Sag's besser!. Grammatik. Arbeitsbuch für Fortgeschrittene. Huebert Verlag GmbH & Co. Ismaning, 2001.
Geiger, S. – Dinsel, S.: Deutsch Übungsbuch Grammatik A2-B2. Huebert Verlag GmbH & Co. Ismaning, 2018.
Dittelová, E. – Zavatčanová, M.: Einführung in das Studium der deutschen Fachsprache. Košice: ES UPJŠ, 2000.

Course language:
German, Slovak language

Notes:

Course assessment
Total number of assessed students: 56

A	B	C	D	E	FX
60.71	10.71	8.93	3.57	8.93	7.14

Provides: Mgr. Ulrika Strömplová, PhD.

Date of last modification: 12.07.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ POF1a/99	**Course name:** Computational Physics I

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

Number of ECTS credits: 4

Recommended semester/trimester of the course: 6.

Course level: I.

Prerequisities: ÚFV/NUM/10

Conditions for course completion:
To successfully complete the course, the student must demonstrate a sufficient degree of understanding of the principles of computer solution of some typical physical problems. The basis of continuous assessment is participation and activity in exercises and work on assignments. The course ends with a final oral exam, the completion of which is conditional on the submission of all four assignments (projects) electronically and with the attached computer program. The credit evaluation of the course takes into account the following student workload: direct teaching (2 credits) and individual work on projects (2 credits). The minimum threshold for completing the course is to obtain at least 50% of the total score, using the following rating scale: A (90-100%), B (80-89%), C (70-79%), D (60- 69%), E (50-59%), F (0-49%).

Learning outcomes:
To teach the basic principles of computer solution of some typical physical problems. The course covers both the area of deterministic methods for solving problems by ordinary and partial differential equations as well as the area of stochastic Monte Carlo simulations and thus forms the basis for further study of more advanced computer methods contained in the follow-up course Computational Physics II.

Brief outline of the course:
1. Introduction to dynamical systems.
2. Numerical solution of systems of ordinary differential equations with initial condition.
3. Euler's method, convergence, error estimation and order of the method. One-step methods, Tylor-type and Runge-Kuta (RK2, RK4) methods.
4. Multistep methods, general linear method (explicit, implicit). Methods based on numerical quadrature.
5. Boundary value problems for ordinary differential equations.
6. Numerical solution of partial differential equations (PDE). Difference methods, their consistence, convergence and stability. Elliptic PDE.
7. Parabolic PDE, diffusion equation. Explicit and implicit methods.
8. Introduction to the Monte Carlo method. Monte Carlo integration and application in statistical physics.

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

Recommended literature:

Basic literature:

POZRIKIDIS, C.: Num. Comp. in Science and Engineering, Oxford Univ. Press, 2008.
GARCIA A.L.: Numerical Methods for Physics, Prentice-Hall, 1994.
LANDAU D.P., BINDER K.: A Guide to Monte Carlo Simulations in Statistical Physics, Cambridge Univ. Press, 5-th edition, 2021.

Other literature:

BERG, B.A.: Introduction to Markov Chain Monte Carlo Simulations and Their Statistical Analysis (http://www.worldscibooks.com/etextbook/5904/5904_intro.pdf)
JANKE, W.: Monte Carlo Simulations of Spin Systems (http://www.physik.uni-leipzig.de/~janke/Paper/spinmc.pdf)

Course language:

Notes:

Course assessment

Total number of assessed students: 130

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

Provides: prof. RNDr. Milan Žukovič, PhD.

Date of last modification: 14.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ PPFM/15	**Course name:** Computer-Based Physical Measurement

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 4.

Course level: I.

Prerequisities:

Conditions for course completion:
Terms and conditions of assessment during the semester
-participation in laboratory exercises in accordance with study regulations and teacher´s instructions
-active participation at laboratory exercises
-submitting all the laboratory reports in accordance with teacher´s instruction
Final assessment:
-based on assessment during the semester
Conditions for successful completion of the course:
-participation in lessons in accordance with the study regulations and teacher's instructions
-achieving the level higher than 50 % in assessment during the semester and in final assessment

Learning outcomes:
By the end of the course student is able to measure physical quantities, process and analyze data with the help of computer. He is able to interpret results, draw conclusions and elaborate formal report about the gained resuls. He is able to explain the physical principles of conducted laboratory exercises to demostrate his conceptual understanding.

Brief outline of the course:
The content of the course involves labworks in physics aimed at selected problems of General Physics I,II,III.
1. Motion in the Earth´s homogenous gravitational field
2. Bungee jumper
3. Ideal gas behaviour
4.Molar mass of gas
5.Thermal expansion of water
6.Electrical resistance and temperature
7.Ohm´s law for closed electric circuit
8.Bulbs´ behaviour in dc electric circuit
9.Planck constant
10. Transient phenomena in RC ana RL circuit
11.Alternating current electric circuit
12. Forced oscillations and resonance

Recommended literature:
CUMMINGS, Karen, LAWS, Priscilla, REDISH, Edward, COONEY, Patrick: Understanding Physics, John Wiley & Sons, 2004

Course language:
English

Notes:

Course assessment
Total number of assessed students: 44

A	B	C	D	E	FX
72.73	9.09	18.18	0.0	0.0	0.0

Provides: doc. RNDr. Zuzana Ješková, PhD.

Date of last modification: 15.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

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

Course assessment Total number of assessed students: 365					
A	B	C	D	E	FX
17.26	20.27	22.47	21.37	15.34	3.29
Provides: doc. RNDr. Roman Soták, PhD., RNDr. Alfréd Onderko, RNDr. Zuzana Šárošiová					
Date of last modification: 16.04.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ DSMb/10	**Course name:** Discrete mathematics II

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

Number of ECTS credits: 5

Recommended semester/trimester of the course: 4.

Course level: I.

Prerequisities: ÚMV/DSMa/10 or ÚMV/DSM3a/10

Conditions for course completion:
In the covered areas of graph theory, the ability to formulate definitions and statements, to present proofs of statements, to explain individual steps in proofs and to solve selected problems related to given topics is required.
During the semester (continuous assessment) two tests take place, from which 50% of points can be obtained, and from the oral exam alike 50% can be obtained. Evaluation: A ... at least 90%, B ... at least 80%, C ... at least 70%, D ... at least 60%, E ... at least 50%, FX ... less than 50% .

Learning outcomes:
Acquired knowledge of basic areas of graph theory, overview of used objects and properties, understanding of important statements and methods, knowledge of possible applications and the ability to formulate and solve problems in this area.

Brief outline of the course:
- (week 1) Introduction to graphs (graph relations, graph operations, special graph classes)
- (week 2-3) Connectivity and distance in graphs (connectedness of vertices, eccentricity, incidence matrix)
- (week 4) (Spanning) Trees (trees isomorphism)
- (week 5-6) Connectivity in graphs (vertex and edge k-connectedness)
- (week (7-8) Independence and coverings (independent set, matching, vertex and edge covering)
- (week 9-10) Extremal graph theory (Ramsey numbers, Turán graphs)
- (week 11-13) Graph colorings (vertex coloring, chromatic polynomial, edge coloring)
- (week 14) Directed graphs (strong/weak connectedness, tounaments, acyclic graphs)

Recommended literature:
1. A. Bondy, U.S.R. Murty, Graph theory, Springer, 2008
2. G. Chartrand, L. Lesniak, P. Zhang, Graphs and digraphs, CRC Press, 2011
3. R. Diestel, Graph Theory, Springer, 2017
4. D. West, Introduction to Graph Theory, Pearson, 2001

Course language:
Slovak

Notes:

Course assessment Total number of assessed students: 209					
A	B	C	D	E	FX
14.83	12.44	24.4	24.88	18.18	5.26
Provides: RNDr. Igor Fabrici, Dr. rer. nat.					
Date of last modification: 16.04.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚMV/ DSMc/10	**Course name:** Discrete mathematics III

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

Number of ECTS credits: 5

Recommended semester/trimester of the course:

Course level: I.

Prerequisities: ÚMV/DSMb/10

Conditions for course completion:
To complete the course, it is necessary to demonstrate the ability to formulate definitions and statements from the lectured material, to understand the relationship between them, to demonstrate the proofs of statements and solve selected problems based on the presented areas of graph theory. The evaluation is given on the basis of semester assessment, activity in exercises and the result of an exam consisting of a final test and an oral part. The semester assessment takes the form of two written tests (focusing on exercises related to the lectured material) during the semester; a maximum of 25 points can be obtained for each of them. A maximum of 50 points can be obtained for the final test and a maximum of 25 points for the oral part of the exam (consisting of two theoretical questions). During the semester, each student can get a maximum of 10 bonus points for the active approach presented at the seminars on the subject.
The summary evaluation is calculated by the formula max {max {a, b} + c, a + b + c / 2} + d + e, where a resp. b is the number of points obtained from the semester tests, c is the number of points from the final test, d is the number of points for the oral part of the exam, and e are points for activity at the seminars. To pass the exam, it is necessary to obtain a total of at least 50 points (otherwise the exam is evaluated by FX), while the rating E is given in the case of points 51-59, D in the case of 60-69, C in the case of 70-79, B in the case of 80-89 and A in the case of more than 90 points.

Learning outcomes:
After completing the course, the student is acquainted (following the prerequisity subject Discrete Mathematics I and II) with other core topics and results of graph theory, which will give the comprehensive insight and knowledge of this area of mathematics.

Brief outline of the course:
Week 1 and 2: Eulerian and hamiltonian graphs.
Week 3 and 4: Measures of connectivity in graphs, Menger theorem and its corollaries.
Week 5: Perfect matchings, Tutte theorem.
Week 6 and 7: Planar graphs and their basic properties, Euler formula and its corollaries.
Week 8: Characterization of planar graphs, theorem of Kuratowski.
Week 9: Structural properties of planar and polyhedral graphs.
Week 10: Chromaticity of planar graphs.
Week 11: Measures of graph nonplanarity I - crossing number and its estimates, crossing lemma.

Week 12: Measures of graph nonplanarity II - the genus of graph, Eulerova theorem for embedded graphs, chromaticity of embedded graphs.
Week 13: Edge colorings, Vizing theorem

Recommended literature:

D.B. West: Introduction to graph theory (2nd edition), Prentice Hall 2001
A. Bondy and U.S.R. Murty: Graph theory, Springer-Verlag 2008
G. Chartrand, L. Lesniak, and P. Zhang, Graphs and digraphs, CRC Press 2011
R. Diestel: Graph Theory (4th edition), Springer-Verlag 2010

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 81

A	B	C	D	E	FX
14.81	30.86	16.05	24.69	13.58	0.0

Provides: prof. RNDr. Tomáš Madaras, PhD.

Date of last modification: 16.04.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: KPPaPZ/PUDB/15	**Course name:** Drug Addiction Prevention in University Students

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 3., 5.

Course level: I.

Prerequisities:

Conditions for course completion:
1st of the evaluation: active participation in the training part (30p). 2nd part of the evaluation: active participation in workshops (20p). In total, students can get 50p and the final evaluation is as follows: 50 - 45: A; 44 - 40: B; 39-35: C; 34-30: D; 29 - 25: E 24 and less: FX. Detailed information in the electronic bulletin board of the course in AIS2. The teaching of the subject will be realized by a combined method.

Learning outcomes:
The student understands the principals of research data based prevention of risk behavior, can describe and explain the determinants of risk behavior as well as protective and risk factors for substance use. Student understands and adequately interprets the theory explaining the background of substance and non-substance addictions.
The student is also able to state and classify the types and forms of prevention, strategies and approaches in prevention, can distinguish effective strategies from ineffective ones.
The student is able to adequately interpret their experience with preventive activities in the group and assume their positive effect as well as limitations and threats.

Brief outline of the course:

Recommended literature:
Orosová, O. a kol. (2012). Základy prevencie užívania drog a 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.

Course language:
slovak

Notes:

Course assessment
Total number of assessed students: 562

A	B	C	D	E	FX
76.87	16.9	4.09	1.6	0.18	0.36

Provides: prof. PhDr. Oľga Orosová, CSc., Mgr. Lucia Barbierik, PhD., Mgr. Lenka Abrinková, PhD., Mgr. Frederika Lučanská, PhD., Mgr. Viera Čurová, Mgr. Marcela Majdanová, PhD.

Date of last modification: 24.06.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ EDS/15	**Course name:** Educational software

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities:

Conditions for course completion:
Conditions for ongoing evaluation:
1. Creation of a worksheet for student (with custom graphics).
2. Creation of a multimedia educational presentation (with pictures, animations and sounds).
3. Creation of an interactive educational quiz (with various types of quiz items).
4. Creation of an instructional educational video.
Conditions for the final evaluation:
1. Creation and presentation of final project on the use of educational software in education.
Conditions for successful completion of the course:
Obtaining at least 50% of points for ongoing and final assignments.

Learning outcomes:
Students will receive, resp. deepen their basic skills in working with:
a) presentation software, programs for creating and editing images, animations, diagrams, sounds, conceptual maps,
b) programs for the creation of didactic tests, questionnaires, surveys,
c) simulation and modeling software,
d) selected subject-oriented educational programs,
Students present and discuss their idea of the use of educational software and educational Internet resources and tools in the selected school subject.

Brief outline of the course:
1. Overview of educational software and educational web resources and tools.
2. Creating and processing images into teaching aids (word clouds, QR codes, diagrams, concept maps).
3. Creating raster animations. Creating and processing sounds.
4. Creation of instructional educational video.
5. Electronic voting (Polleverywhere, Plickers, Kahoot!) and questionnaire creation (Google Forms).
6. Creation of didactic tests (Google Forms, HotPotatoes).
7. Collaborative web applications (mind42, miro, whiteboard, padlet).
8. Online communication tools (BBB).

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

Recommended literature:

SOLOMON, Gwen and Lynne SCHRUM, 2014. Web 2.0 How-to for Educators. Second. International Society for Technology in Education, 314 p. ISBN 978-1564843517.
STOBAUGH, Rebecca, 2019. Fifty Strategies to Boost Cognitive Engagement: Creating a Thinking Culture in the Classroom (50 Teaching Strategies to Support Cognitive Development). Solution Tree Press, 176 p. ISBN 978-1947604773.
LEMOV, Doug, 2015. Teach Like a Champion 2. 0: 62 Techniques That Put Students on the Path to College [online]. 2nd edition. John Wiley & Sons, Incorporated, 509 p. [cited 2021-7-10]. ISBN 9781118898628. Available from: https://ebookcentral.proquest.com/lib/upjs-ebooks/detail.action?docID=1895720
European Schoolnet: Transforming education in Europe [online]. [cited 2021-7-10]. Available from: http://www.eun.org/home
Science On Stage Europe [online]. Science on Stage Europe e.V. [cited 2021-7-10]. Available from: https://www.science-on-stage.eu/

Course language:
Slovak and partly English due to selected programs and information sources

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

Course assessment
Total number of assessed students: 77

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

Provides: doc. RNDr. Ľubomír Šnajder, PhD.

Date of last modification: 01.08.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ ELP1/01	**Course name:** Electonics Practical

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

Number of ECTS credits: 3

Recommended semester/trimester of the course: 6.

Course level: I.

Prerequisities: ÚFV/ELE1/07 or ÚFV/ELEM1/15

Conditions for course completion:
For successful exam of the subject, the student must demonstrate sufficient understanding of selected problems from electronics. Knowledge of student will be tested by talk during practices. It is necessary to properly process the theoretical preparation of the topic for the preparation of the experiment. Subsequently analyze and interpret experimental results. Condition for obtaining credits is to perform all tasks and passing protocols from measurements. Credit assessment of the subject takes into account the following student burden: performing experimental measurements (1 credit), self-study and theoretical preparation (1 credits) and drafting protocols (1 credits). The minimum boundary for completing the subject is to obtain at least 50% of the total point evaluation, using the following evaluation scale: A (90-100%), B (80-89%), C (70-79%), D (60- 69%), E (50-59%), F (0-49%).

Learning outcomes:
Practical work of students in the design, construction and properties of the measurements of electronic circuits and interpretation of the results obtained to verify and consolidate the theoretical knowledge acquired in lectures on the subject Electronics.

Brief outline of the course:
1. Combinatorial logical circuits.
2.Logical memory circuits.
3. Logical sequence circuits.
4. Rectifiers, filters, stabilizers.
5. Generators of harmonic signals.
6. Operational amplifiers and operational network interfaces.
7. Digital-to-analog converters.
8. Analog-to-digital converters.
9. Reserve.

Recommended literature:
1. Delaney C.F.G.: Electronics for the Physicist with Aplications. John Willey & Sons, New York, 1980.
2. Zbar P.B., Malvino A.P., Miller M.A.: Basic Electronics: a Text-Lab Manual. Macmillan/ McGraw – Hill, New York, 1994.

Course language:
1. Slovak
2. English

Notes:

Course assessment
Total number of assessed students: 42

A	B	C	D	E	FX
92.86	0.0	2.38	4.76	0.0	0.0

Provides: RNDr. Vladimír Tkáč, PhD.

Date of last modification: 20.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ ELEM1/15	**Course name:** Electronics

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

Number of ECTS credits: 3

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities: ÚFV/VF1b/03 or ÚFV/VFM1b/15

Conditions for course completion:
Exam

Learning outcomes:
To explain physical principles of classical electronic components and systems and technologies of their realization. To perform analysis of properties and functions of basic electronic elements, electronic circuits and information transmission and processing systems. To introduce student into basic elements and devices in area of nanoelectonics and to explain methods of their fabrication and principles of their functioning.

Brief outline of the course:
1. Introduction to electronics: Basic components of electronic circuits, basic electrical laws
2. Passive components, basic properties of semiconductors
3. Semiconductors without PN junction, components with PN junction
4. Semiconductors with PN junction
5. Transistor phenomenon, transistor
6. Electronic circuit with transistor
7. Operational amplifiers
8. Sources and generators
9. Two-value logic algebra, combinational logic circuits
10. Digital memory circuits
11. Sequential logic circuits
12. Digital-analog converters, analog-digital converters

Recommended literature:
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 Aplications. John Willey & Sons, 1980.
3. Wolt E. L.: Quantum Nanoelectronics, An introduction to electronic nanotechnology and quantum computing, Wiley-VCh, 2009

Course language:
Slovak

Notes:

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

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

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

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 4.

Course level: I.

Prerequisities:

Conditions for course completion:
Active participation in class and completed homework assignments. Students are allowed to miss 2 classes at the most
Continuous assessment:
1 credit test taken presumably in weeks 6/7
1 project (quiz on the topic of the student´s field of study) 25% of the continuous assessment
5 LMS quizzes (25% of the continuous assessment)
In order to be admitted to the final exam, a student has to score at least 65 % from the continuous assessment
The exam test results represent 50% of the final grade for the course, continuous assessment results represent the other 50% of the final grade.
The final grade for the course will be calculated as follows:
A 93-100, B 86-92, C 79-85, D 72-78, E 65-71, FX 64 and less.

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

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

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

Recommended literature:
lms.upjs.sk - e-kurz Odborný anglický jazyk pre prírodné vedy.
Redman, S.: English Vocabulary in Use, Pre-intermetdiate, Intermediate. Cambridge University Press, 2003.
Armer, T.: Cambridge English for Scientists. CUP, 2011.
Wharton J.: Academic Encounters. The Natural World. CUP, 2009.
P. Fitzgerald : English for ICT studies. Garnet Publishing, 2011.
https://worldservice/learningenglish, https://spectator.sme.sk
www.isllibrary.com
linguahouse.com

Course language:
English, level B2 (CEFR)

Notes:

Course assessment
Total number of assessed students: 3056

A	B	C	D	E	FX
38.29	26.18	16.46	9.55	7.46	2.06

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

Date of last modification: 05.02.2023

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ FRPa/19	**Course name:** Function of real variable

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 4 **Per study period:** 28 / 56
Course method: present

Number of ECTS credits: 7

Recommended semester/trimester of the course: 1.

Course level: I.

Prerequisities:

Conditions for course completion:
Continuous assessment of student's work during the semester (submission of compulsory homework, writing three tests). Final test and oral discussion on the topics of the subject.

Learning outcomes:
The course provides an introductory knowledge on basic tools of differential and integral calculus of real functions of one real variable, and a development of certain calculation skills in the field.

Brief outline of the course:
1. Basics of mathematical logic and notations (1 week)
2. Real functions - basic notions, operation, graphs and their transformations (2 weeks)
3. Continuity of a real-valued function (1 week)
4. Derivative of a function using the geometric concepts, rules of differentiation (2 weeks)
5. Basic of differential calculus - relations with monotonicity and convexity, extremas, using in optimisation, geometric and physics tasks (2 weeks)
6. Primitive function, methods of their finding (3 weeks)
7. Newton definite integral - methods of its computation, using in geometric and physics tasks (2 weeks)

Recommended literature:
1. Kulcsár, Š. - Kulcsárová, O.: Zbierka úloh z matematickej analýzy I., UPJŠ, 2002.
2. Kulcsár, Š. - Kulcsárová, O.: Zbierka úloh z matematickej analýzy II., UPJŠ, 2003.
3. Hutník, O. - Kulcsár, Š. - Kulcsárová, O. - Mojsej, I.: Zbierka úloh z matematickej analýzy III., UPJŠ, 2011.
4. Demidovič, B. P.: Sbírka úloh a cvičení z matematické analýzy, Fragment, Praha, 2003.
5. Brannan, D.: A First Course in Mathematical Analysis, Cambridge University Press, Cambridge 2006.
6. Bruckner, A. M., Bruckner J. B., Thomson, B. S.: Real Analysis, Second Edition, ClassicalRealAnalysis.com, 2008.
7. Zorich, V. A.: Mathematical Analysis I, Springer-Verlag 2002.

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 757

A	B	C	D	E	FX
8.98	8.45	17.17	21.53	32.76	11.1

Provides: doc. RNDr. Ondrej Hutník, PhD., RNDr. Lenka Halčinová, PhD., RNDr. Jana Borzová, PhD.

Date of last modification: 16.04.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ VBFM1/15	**Course name:** General Biophysics I

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

Number of ECTS credits: 3

Recommended semester/trimester of the course: 3.

Course level: I.

Prerequisities:

Conditions for course completion:
Exam.
During an exam, a student should be able to demonstrate his/her knowledge from the parts of Biophysics which are described in the brief outline of the course.

Learning outcomes:
To provide information about the object, significance and role of biophysics in science. The main emphasis will be given on the understanding of the principles determining the structure and function of the most important biological structures (nucleis acids, proteins, biomembranes) as well as on the thermodynamics and kinetics of selected chemical and biophysical processes.

Brief outline of the course:
Week 1
Areas of interest of biophysics and its importance and position in science. Structure of biophysics. Characterization of molecular, cellular, medical, environmental and radiation biophysics. Scientific disciplines related to biophysics. The future of biophysics.
Week 2
Intra-molecular and intermolecular interactions. Covalent bonds. Coulomb (ionic) interactions. Van der Waals forces. Lennard - Jones potential. Hydrogen bonds. The role of hydrogen bonds in biological macromolecules. Hydrophobic interactions. Hydrating forces. Empirical analytical form for the potential energy of intramolecular interactions. Stabilizing non-covalent interactions in biopolymers (proteins, nucleic acids, biological membranes).
Week 3
Thermodynamics in biological systems. Definition of thermodynamics. Thermodynamic system. 1st law of thermodynamics (law of conservation of energy). Internal energy and enthalpy. Heat capacity. Examples of the use of the study of enthalpy change in biological processes. 2nd law of thermodynamics (law of process spontaneity). Entropy. 3rd law of thermodynamics. Gibbs energy. Dependence of Gibbs energy on temperature - Gibbs - Helmoltz 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. Molecelar 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. Hoobbie and B.J. Roth. Intermediate Physics for Medicine and Biology (4th Edition), Springer Science, 2007.

Course language:
English language

Notes:

Course assessment
Total number of assessed students: 12

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

Provides: doc. Mgr. Daniel Jancura, PhD.

Date of last modification: 17.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ VFM1a/15	**Course name:** General Physics I

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 4 / 2 **Per study period:** 56 / 28
Course method: present

Number of ECTS credits: 6

Recommended semester/trimester of the course: 1.

Course level: I.

Prerequisities:

Conditions for course completion:
Terms and conditions of assessment during the semester
-participation in classes in accordance with study regulations and teacher´s instructions
-active participation at seminars and exercises
-submitting all the assignments in accordance with teacher´s instruction
-tests during the semester
-project group work and its successful presentation and defence
Final assessment:
-final oral examination
Conditions for successful completion of the course:
-participation in lessons in accordance with the study regulations and teacher's instructions
-achieving the level higher than 50 % in assessment during the semester and in final assessment

Learning outcomes:
By the end of the course student masters basic knowledge connected with mechanics, molecular physics and thermodynamics. Student will be able to solve various problems connected with the course content and apply gained knowledge in different situations.

Brief outline of the course:
Basic knowledge of the calculus, vector algebra. Standards and units. Kinematics. Dynamics. The principle of relativity in the classical mechanics. Gravitation. Mechanics of many-particle systems. The motio of rigid bodies. Deformation, elasticity. Mechanics of fluids and gases. Laws of ideal gases. Kinetic theory. The thermodynamic laws. Statistical character of the second law. Entropy. Molecular phenomena in liquids and solids. Phase transitions.

Recommended literature:
CUMMINGS, Karen, LAWS, Priscilla, REDISH, Edward, COONEY, Patrick: Understanding Physics, John Wiley & Sons, 2004

Course language:
English

Notes:

Course assessment
Total number of assessed students: 212

A	B	C	D	E	FX
27.83	16.51	19.81	13.68	18.87	3.3

Provides: doc. RNDr. Zuzana Ješková, PhD.

Date of last modification: 15.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ VFM1b/15	**Course name:** General Physics II

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 4 / 2 **Per study period:** 56 / 28
Course method: present

Number of ECTS credits: 6

Recommended semester/trimester of the course: 2.

Course level: I.

Prerequisities: ÚFV/VF1a/12 or ÚFV/VFM1a/15

Conditions for course completion:
Two written distance tests.
Distance oral exam.

Learning outcomes:
To obtain a general view on basic electric magnetic phenomena and ability to solve basic problems of this subject.

Brief outline of the course:
Electric field in the free space. Work of the forces in the electrostatic field. Electrostatic field and steady current. Current in electrolytes, semiconductors, gasses and vacuum. Thermoelctric effects. Magnetic field in the free space. The interaction of moving charges with the electric current. Quasi steady electric field. Electromagnetic induction. Energy of magnetic field. AC current and circuits with ac current. Multiphase AC current. Rotating magnetic field. Electric effects in the substances. Magnetic properties of the substancies. Magnetic polarization. Diamagnetism and paramagnetism, Magnetic ordering. Ferromagnetism.

Recommended literature:
I. S. Grant, W.R. Phillips, Electromagnetism, John Wiley&Sons, Ltd, England, 1990

Course language:
english

Notes:

Course assessment
Total number of assessed students: 45

A	B	C	D	E	FX
44.44	17.78	17.78	4.44	2.22	13.33

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

Date of last modification: 29.03.2020

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ VFM1c/15	**Course name:** General Physics III

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 4 / 2 **Per study period:** 56 / 28
Course method: present

Number of ECTS credits: 6

Recommended semester/trimester of the course: 3.

Course level: I.

Prerequisities: ÚFV/VF1b/03 or ÚFV/VFM1b/15

Conditions for course completion:
Written test (2x) from seminars during the semester. Oral examination.

Learning outcomes:
The objective is to acquaint the students with the basis of oscilations, waves and optics.

Brief outline of the course:
Undamped oscilations, Mathematical, Physical and Torsional pendulum, Damped oscilations, Fourier transformation, Forced oscilations. Waves, their generation, waves equation.Interference. Huyghens principle. Reflection, difraction. Doppler effect. Waves speed in materials. Acoustics. Geometrical optics. Mirrors, lens. Fotometry.
Light as electromagnetic wave. Dispersion, absorption, interference, difraction, polarization. Photon's theory of light. Law of emision and absorption, Planck's law of radiation. Lasers.

Recommended literature:
1. A. Hlavička et al., Fyzika pro pedagogické fakulty, SPN, 1971
2. R.P. Feynman et al., Feynmanove prednášky z Fyziky I,II,III, ALFA, 1985
3. D. Halliday et al.,Fyzika-Vysokoškolská učebnice obecné fyziky, VUTIUM, 2010
4. J. Fuka, B. Havelka, Optika a atómová fyzika, SPN,1961
5. A. Štrba, Všeobecná Fyzika 3 – Optika, ALFA, 1979

Course language:
slovak

Notes:

Course assessment
Total number of assessed students: 75

A	B	C	D	E	FX
36.0	18.67	28.0	10.67	6.67	0.0

Provides: doc. RNDr. Ján Füzer, PhD.

Date of last modification: 28.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ VFM1d/15	**Course name:** General Physics IV

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 4 / 2 **Per study period:** 56 / 28
Course method: present

Number of ECTS credits: 6

Recommended semester/trimester of the course: 4.

Course level: I.

Prerequisities: ÚFV/VF1c/10 or ÚFV/VF1c/12 or ÚFV/VFM1c/15

Conditions for course completion:
- active participation in lectures and excersises
- submission of solved tasks
- 2x test
- an exam

Credit evaluation of the subject: direct teaching and consultations (2credits), self-study (1credit), practical activities- solved tasks (1 credit), evaluation (2 credits), a total of 6 credits.
Minimum limit for completion of the course is to obtain at least 51% of the total evaluation.

Learning outcomes:
Basic knowledge about the atomic structure and spectra and nuclei, and elementary particles. Basic experimental methods in nuclear physics and passage of nuclear radiation through media.

Brief outline of the course:
1.-6. week Atomic Physics - A.Kravčáková (P):
Corpuscular-wave dualism: De Broglie waves. Experimental confirmation of de Broglie's hypothesis. Uncertainty principle.
Atom structure: Atomic hypothesis. Rutherford's experiment. Bohr model of the atom.
Hydrogen radiation spectra. Combination principle. Quantum mechanical description of a hydrogen atom.
Electron shell: Spectra of hydrogen type atoms. Experimental verification of the existence of discrete levels of atoms (Franck-Hertz experiment). Angulat momentum of electron motion. Stern-Gerlach experiment. Quantum states of electrons. Atoms with more electrons. Alkali metal spectra. Total angular momentum of an atom. Magnetic momentum of an atom. An atom in an external magnetic and electric field. Zeeman's phenomenon. Selection rules. Pauli's principle. Periodic table of elements. X-ray spectra.
Molecules: Ion and covalent coupling, spectra of molecules.
7.-12. week Nuclear Physics - J.Vrláková (P):
Basic characteristics of atomic nuclei: Mass and electric charge. Radius of the atomic nucleus. Binding energy. Spin and magnetic momentum of the nucleus. Quadrupole momentum. Parity.
Nuclear forces and models of atomic nuclei: Properties of nuclear forces. Meson theory of nuclear forces. Models of atomic nuclei (droplet, layer and generalized model).

Radioactive radiation: Basic laws of radioactive decay. Law of decay. Alpha decay. Beta decay. Processes taking place in the nucleus during beta conversion. Neutrino existence hypothesis. Fermi's theory. Internal conversion. Gamma radiation.
Nuclear reactions: Basic terms and definitions. Classification of nuclear reactions. Conservation laws. Effective cross section. Mechanisms of nuclear reactions. Basic types of reactions. Breit-Wigner formula. Reactions with neutrons. Fission of atomic nuclei. Mechanism of fission. Nuclear reactor. Thermonuclear reactions.
Week 13 Subnuclear physics - A.Kravčáková (P):
Elementary particles: The concept of an elementary particle. Basic characteristics of particles. Conservation laws. Types of interactions. Antiparticles. Classification of elementary particles. Strange particles. Resonances. Quark model of hadrons.
Cosmic radiation: Primary and secondary components. Elementary particles and cosmology.
Week 14 Experimental methods - A.Kravčáková (P):
Passage of radiation through matter: The passage of heavy charged particles, electrons and gamma radiation through the matter.
Detectors: Basic characteristics of detectors. Volt-ampere characteristic. Gas detectors. Ionization chambers and Geiger-Müller computer. Scintillation, Cherenkov and semiconductor detectors. Track detectors.
Particle accelerators: Linear accelerator. Cyclic accelerators. Colliders.

Recommended literature:

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

Course language:
slovak and english

Notes:

Course assessment
Total number of assessed students: 34

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

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

Date of last modification: 16.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ GEO2a/15	**Course name:** Geometry I

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 3 / 2 **Per study period:** 42 / 28
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 6.

Course level: I.

Prerequisities:

Conditions for course completion:
Two written tests.
Written and oral examinations
For continuous evaluation - max. 40 points
for the written test - max. 20 points
for oral exams - max. 40 points)
Final score:
A: 100-91 points, B: 90-81, C: 80-71, D: 70-61, E: 60-51, F: less than 51 points
Note: In each of the student needs to have at least 50% max. number of points

Learning outcomes:
Mastering the basics of the theory of linear and quadratic formations in the Affine and Euclidean space, mastering the methods of solving problems in analytical geometry in relation to the secondary school curriculum.

Brief outline of the course:
1. Affine n-dimensional space - definition.
2. Linear coordinate system.
3. Subspaces, the parametric and non-parametric representation.
4. The relative position of the two subspaces.
5. Bundles of lines.
6. The arrangement of points on the line.
7. Convex sets. Changing the system of linear coordinates.
8. Euclidean space - definition of (scalar and outer product).
9. Euclidean distances and deviations subspaces.
10. The rate of the size of convex sets. Triangle and trigonometric theorems.
11.-12. Conic and line.

Recommended literature:
1. M.Sekanina, L.Boček, M.Kočandrle, J.Šedivý: Geometrie 1, SPN Praha 1986
2. M.Hejný, V.Zaťko, P.Kršňák: Geometria 1, SPN Bratislava 1985
3. J.Eliaš, J.Horváth, J.Kajan: Zbierka úloh z vyššej matematiky 1, Alfa Bratislava
4. M.Trenkler: Materiály uvedené na Internete.

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 167

A	B	C	D	E	FX
19.16	17.37	22.75	17.96	13.77	8.98

Provides: doc. RNDr. Dušan Šveda, CSc., RNDr. Monika Krišáková

Date of last modification: 19.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: KF/ DF2p/03	**Course name:** History of Philosophy 2 (General Introduction)

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

Number of ECTS credits: 4

Recommended semester/trimester of the course: 6.

Course level: I., II.

Prerequisities:

Conditions for course completion:
The condition for awarding the evaluation will be the active approach of students to fulfilling their study obligations, independent work with selected philosophical texts in the library, active participation and creative work in seminars. In connection with the possibility of interrupting face-to-face teaching, there will be greater demands on the student's independent study and the processing of professional literature, which will be continuously evaluated, using e-mail to communicate with the teacher, at the end of the semester, preparing and handing in the semester's seminar work by the set date, or also passing a knowledge test - about which the students will be informed in advance in sufficient time.

Learning outcomes:
Deepening knowledge about the development of spiritual culture in the European spiritual space and pointing out the most important sources of this development: (1) ancient philosophy and science, (2) Christianity as the second pillar of Europe, (3) the Renaissance and the emergence of modern science (mathematical natural science) as the third pillar of European development. Development of critical thinking skills, active position in professional (ethics of science), public and private life (ethics of responsibility). Transcending narrowly specialized views of the world.

Brief outline of the course:

Recommended literature:
Antológia z diel filozofov. Predsokratovci a Platon. Zost. J. Martinka. Bratislava: Nakladateľstvo Epocha 1970; Antológia z diel filozofov. Od Aristotela po Plotina. Zost. J. Martinka. Bratislava: Nakladateľstvo Pravda 1972. Predsokratovci a Platon. Antológia z diel filozofov. Zost. J. Martinka. Bratislava: Vydavateľstvo Iris 1998. Od Aristotela po Plotina. Antológia z diel filozofov. Zost. J. Martinka. Bratislava: Vydavateľstvo IRIS 2006. Anzenbacher,A.: Úvod do filozofie. Prel. K. Šprunk. Praha: SPN 1990. Barthes, R.: Mytologie. Prel. J. Fulka. Praha: Dokořán 2004. Bělohradský, V.: Společnost nevolnosti. Eseje z pozdější doby. Praha: SLON 2009. Benjamin, W.: Iluminácie. Prel. A. Bžoch; J. Truhlářová. Bratislava: Kalligram 1999. Borges, J. L.: Borges ústne. Prednášky a eseje. Prel. P. Šišmišová. Bratislava: Kalligram 2005. Cassirer, E.: Esej o človeku. Prel. J. Piaček. Bratislava: Nakladateľstvo Pravda 1977. Debord, G.: Společnost spektáklu. Prel. J. Fulka; P. Siostrzonek. Praha: Nakladatelství :intu: 2007. Farkašová, E.: Na rube plátna. Bratislava: Vydavateľstvo Spolku slovenských spisovateľov 2013.

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

Course language:

Notes:

Course assessment
Total number of assessed students: 746

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

Provides: doc. PhDr. Peter Nezník, CSc.

Date of last modification: 11.07.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: KPE/ INP/17	**Course name:** Inclusive Pedagogy

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 85

A	B	C	D	E	FX
65.88	25.88	4.71	1.18	2.35	0.0

Provides: PaedDr. Michal Novocký, PhD.

Date of last modification: 20.06.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚMV/ IPU/10	**Course name:** Informatics course for teachers of mathematics

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 6.

Course level: I.

Prerequisities:

Conditions for course completion:
To master the use of basic algorithmic structures, to gain the ability to write algorithms for the construction of geometric shapes in the environment of turtle geometry. To be able to assess the possibilities of using interactive applications available on the Internet and to design procedures for the application of selected applications in the teaching of mathematics. To learn to use numerical and graphical means of a spreadsheet in data analysis, creating models to solve various mathematical problems.
Evaluation:
Algorithm creation paper - 6 b
Elaboration of dynamic constructions for solving geometric problems - 3 b
Seminar work on the use of interactive applications - 7 b + 3 b
Poll - 1 b
Tasks for creating numerical and graphical models in a spreadsheet - 4 b
Classification scale:
A: 91 % - 100 %,
B: 81 % - 90 %,
C: 71 % - 80 %,
D: 61 % - 70 %,
E: 51 % - 60 %,
FX: 0 % - 50 %.

Learning outcomes:
Knowledge and skills from the basics of working with standard information and communication technologies, which provide a variety of opportunities to support mathematics education. Skills to use basic commands of turtle geometry for generalization and writing algorithms for construction of geometric shapes. To master the basic principles of creating structures in the environment of dynamic geometry. Acquire creative and evaluative skills to plan and prepare a meaningful integration of modern technologies into mathematics education.

Brief outline of the course:
1-5: Use of basic algorithmic constructions in turtle geometry for the construction of geometric shapes,

6th - 7th: Basics of work in the environment of dynamic geometry, creation of dynamic constructions,
8th - 9th: Interactive teaching applications available on the Internet, selected possibilities of using digital technologies in mathematics education.
10. - 12 .: Use of numerical and graphical representations of data and modeling in a spreadsheet environment in solving mathematical problems.

Recommended literature:

Brdička, B.: Role internetu ve vzdělávaní, 2003, http://it.pedf.cuni.cz/~bobr/role/econt.htm.
Lukáč, S. a kol.: IKT vo vyučovaní matematiky, Asociácia projektu Infovek 2002.
Vaníček, J.: Počítačové kognitivní technologie ve výuce geometrie. Pedagogická fakulta Univerzity Karlovy, 2009.
Šťastný, Z.: Matematické a statistické výpočty v Microsoft Excelu, Computer Press 2001.

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 108

A	B	C	D	E	FX
50.93	25.93	15.74	5.56	1.85	0.0

Provides: doc. RNDr. Stanislav Lukáč, PhD.

Date of last modification: 12.01.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ UAS/13	**Course name:** Introduction to Astronomy

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

Number of ECTS credits: 3

Recommended semester/trimester of the course: 4.

Course level: I.

Prerequisities:

Conditions for course completion:
To successfully complete the course, the student must demonstrate a sufficient understanding of the basic concept from the field of astronomy and astrophysics. In addition to direct participation in teaching, independent student work is also required within the self-study of topics assigned by the teacher. In order to obtain an assessment and thus also credits, the student must meet the requirements of a continuous written test (with a weight of 30% of the total assessment) and pass an oral exam (with a weight of 70% of the total assessment).
Rating scale: A (90-100%), B (80-89%), C (70-79%), D (60-69%), E (50-59%), F (0-49%) .

Learning outcomes:
After completing the lectures and on the basis of the final evaluation, the student will demonstrate adequate mastery of the content standard of the course, which is defined by a brief syllabus of the course and recommended literature. Theoretical mastery of the content of the subject allows him to understand the subject of the study of astronomy and astrophysics, to orient himself in the study of the solar system, the origin and evolution of stars and galaxies. Based on the acquired knowledge, he / she is able to follow up on specialized courses in the further study of astrophysics

Brief outline of the course:
The time schedule of the course content is updated in the electronic bulletin board of the course.
1. Astronomy as a science
2. Our place in the Universe
3. Basic astronomical terminology
4. Coordinate systems
5. Time and calendar
6. Astronomical telescopes and instruments
7. Sun as a star
8. Planets in the Solar system
9. Asteroids, comets and meteors
10. Creation and evolution of the stars
11. Extrasolar planets
12. Evolution of the Galaxy and the Universe

Recommended literature:

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

Course language:

Notes:

Course assessment
Total number of assessed students: 59

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

Provides: doc. Mgr. Štefan Parimucha, PhD.

Date of last modification: 21.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ UVF/05	**Course name:** Introduction to General Physics

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 1.

Course level: I.

Prerequisities:

Conditions for course completion:
Terms and conditions of assessment during the semester
-participation in classes in accordance with study regulations and teacher´s instructions
-active participation at seminars and exercises
-submitting all the assignments in accordance with teacher´s instruction
-tests during the semester
Final assessment:
-based on assessment during the semester
Conditions for successful completion of the course:
-participation in lessons in accordance with the study regulations and teacher's instructions
-achieving the level higher than 50 % in assessment during the semester and in final assessment

Learning outcomes:
By the end of the course student is able to solve problems connected with mechanics, molecular physics and thermodynamics. In solving problems student is able to apply digital tools for data collection, videomeasurement and computer modelling and data processing and their analysis.

Brief outline of the course:
The course is an auxiliary subject to the course General physics 1 - Mechanics, Molecular Physics and Thermodynamics aimed to development of conceptual understanding and problem solving connected with the following areas:
1. Kinematics and dynamics of motion along a line and two-dimensional motion of particle. Equation of motion.
2. Gravitational field. Projectile motion.
3. Work, power and energy. Law of energy conservation.
4. Rotational motion. Equation of rotational motion.
5. Law of momentum conservation and angular momentum conservation.
6. Deformation. Hook´s law.
7. Fluid mechanics.
8. Gases. Ideal gas laws.
9.Basics of thermodynamics. First law of thermodynamics.
10.Heat and heat exchange.

11. Liquids. Surface tension.
12. Changes of state.

Recommended literature:
CUMMINGS, Karen, LAWS, Priscilla, REDISH, Edward, COONEY, Patrick: Understanding Physics, John Wiley & Sons, 2004

Course language:
English

Notes:

Course assessment
Total number of assessed students: 327

A	B	C	D	E	FX
37.31	20.49	24.16	12.84	4.89	0.31

Provides: doc. RNDr. Zuzana Ješková, PhD.

Date of last modification: 15.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ UVF2/07	**Course name:** Introduction to General Physics II

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 2.

Course level: I.

Prerequisities:

Conditions for course completion:
Terms and conditions of assessment during the semester
-participation in classes in accordance with study regulations and teacher´s instructions
-active participation at seminars and exercises
-submitting all the assignments in accordance with teacher´s instruction
-tests during the semester Final assessment:
-based on assessment during the semester
Conditions for successful completion of the course:
-participation in lessons in accordance with the study regulations and teacher's instructions
-achieving the level higher than 50 % in assessment during the semester and in final assessment

Learning outcomes:
By the end of the course student is able to solve problems and explain phemomena and experiments connected with selected areas of Electricity and Magnetism.

Brief outline of the course:
The course is an auxiliary subject to the course General physics 2 - Electricity and Magnetism aimed to development of conceptual understanding and problem solving connected with the following areas:
1. Electric field. Coulomb´s law.
2. Work, electric potential energy, electric potential.
3. Electric capacitance and capacitors.
4. Electric current. Ohm´s law, Kirchhoff´s laws.
5. Work and power. Energy and efficiency of sources of electromotive force
6. Magnetic field.
7. Interaction between magnetic field and electric charge.
8. Transient phenomena in RC circuit.
9. Electromagnetic induction.
10. Transient phenomena in RL circuit.
11. Alternating current circuits.
12. Resonance in series and paralel circuits.

Recommended literature:

Matsushita, Teruo. Electricity and Magnetism, Springer 2017
CUMMINGS, Karen, LAWS, Priscilla, REDISH, Edward, COONEY, Patrick: Understanding Physics, John Wiley & Sons, 2004

Course language:
English

Notes:

Course assessment
Total number of assessed students: 270

A	B	C	D	E	FX
39.26	22.59	20.74	8.15	9.26	0.0

Provides: doc. RNDr. Zuzana Ješková, PhD.

Date of last modification: 15.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ZMF/17	**Course name:** Introduction to Mathematics for Physicists

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

Number of ECTS credits: 3

Recommended semester/trimester of the course: 1.

Course level: I.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 287

A	B	C	D	E	FX
40.77	21.25	18.47	10.45	8.71	0.35

Provides: RNDr. Tomáš Lučivjanský, PhD., doc. RNDr. Jozef Hanč, PhD.

Date of last modification: 16.11.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: Dek. PF UPJŠ/USPV/13	**Course name:** Introduction to Study of Sciences
Course type, scope and the method: **Course type:** Lecture / Practice **Recommended course-load (hours):** **Per week: Per study period:** 12s / 3d **Course method:** present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course: 1.	
Course level: I.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 2012

abs	n
88.37	11.63

Provides: doc. RNDr. Marián Kireš, PhD.
Date of last modification: 30.08.2022
Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ UAD/10	**Course name:** Introduction to data analysis

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 3.

Course level: I.

Prerequisities:

Conditions for course completion:
Test (40p) and individual project work (20p).
Oral presentation of the individual project work (5p).
At least 50% must be obtained from each part.
Final evaluation: ≥90% A; ≥80% B; ≥70% C; ≥60% D; ≥50% E; <50% FX.

Learning outcomes:
To know the basic purpose of statistical data analysis, its methods and statistical thinking and understand its importance for science and practical life.
To understand elementary statistical concepts.
To gain experience in handling real data using spreadsheet Excel and statistical software R.

Brief outline of the course:
1. Introduction (the basic philosophy and aim of statistical data analysis, descriptive and inductive statistics)
2. Collecting Data (types of data, random sample, randomized experiment)
3. Handling Data (visualization, summarizing – measures of center, measures of variability, skewness and kurtosis, empirical rule) - 5 weeks
4. Relationships in data (introduction to regression and correlation) - 4 weeks
5. Statistical inference (elementary view into estimation and testing hypothesis) - 2 weeks

Recommended literature:
1. Anděl, J.: Statistické metody, Matfyzpress, Praha, 1998 (in Czech)
2. Rossman, A.J. et al.: Workshop Statistics: Discovery with Data and Fathom, 3rd ed. Wiley, 2009
3. Utts, J.M.: Seeing Through Statistics, 4th ed., Thomson Brooks/Cole, Belmont, 2014
4. Utts, J.M., Heckard R.F.: Mind on Statistics, 6th ed. Thomson Brooks/Cole, Belmont, 2021
5. Zvára, K., Štěpán, J.: Pravděpodobnost a matematická statistika, Matfyzpress, Praha, 2001 (in Czech)

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 390

A	B	C	D	E	FX
37.44	25.13	26.41	10.0	0.51	0.51

Provides: doc. RNDr. Martina Hančová, PhD.

Date of last modification: 13.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ UDM/10	**Course name:** Introduction to mathematics

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

Number of ECTS credits: 3

Recommended semester/trimester of the course: 1.

Course level: I.

Prerequisities:

Conditions for course completion:
Two tests during the semester.

Learning outcomes:
Repetition of problematic sections of the secondary mathematics by interesting tasks. Explanation of basic terms, properties and proof methods used in various areas of mathematics.

Brief outline of the course:
Simplification of algebraic expressions. Real number, absolute value of real numbers; equations and inequalities. Irrational equations and inequalities. Concept of function. Linear and quadratic function; equations and inequalities. Exponencial and logarithmic function; equations and inequalities. Goniometric functions; equations and inequalities. Complex numbers.

Recommended literature:
1. V. Medek - L. Mišík - T. Šalát: REPETITÓRIUM STREDOŠKOLSKEJ MATEMATIKY, Alfa Bratislava, 1976
2. S. Richtárová - D. Kyselová: MATEMATIKA (pomôcka pre maturantov a uchádzačov o štúdium na vysokých školách), Enigma Nitra, 1998
3. O. Hudec – Z. Kimáková – E. Švidroňová: PRÍKLADY Z MATEMATIKY (pre uchádzačov o štúdium na TU v Košiciach), EF TU Košice, 1999
4. F. Peller – V. Šáner – J. Eliáš – Ľ. Pinda: MATEMATIKA – Podklady na prijímacie testy pre uchádzačov o štúdium, Ekonóm Bratislava, 2000/2001
5. F. Vesajda – F. Talafous: ZBIERKA ÚLOH Z MATEMATIKY pre stredné všeobecnovzdelávacie školy a gymnáziá, SPN Bratislava, 1973
6. J. Lukášová – O. Odvárko – B. Riečan – J. Šedivý – J. Vyšín: ÚLOHY Z MATEMATIKY pre 4. ročník gymnázia, SPN Bratislava, 1976

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 508

A	B	C	D	E	FX
23.62	20.67	17.52	15.94	10.83	11.42

Provides: RNDr. Veronika Hubeňáková, PhD., RNDr. Lucia Janičková, PhD., RNDr. Monika Krišáková

Date of last modification: 24.01.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/LCO/10	**Course name:** Linear and integer programming

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

Number of ECTS credits: 5

Recommended semester/trimester of the course:

Course level: I.

Prerequisities: ÚMV/ALGa/10

Conditions for course completion:
Continuous evaluation: a small test during each tutorial, two large tests, a project with real data and commercial software. Bonus points awarded for homeworks (formulation of proofs). A necessary condition for final exam is at least 50% of points from th semester. Final exam: demonstrate the understanding of the theory and ability of argumentation.

Learning outcomes:
Ability to formulate practical tasks in a form of a linear program. Proficiency in solving linear programs by several methods, also using software. Understanding of the underlying theory and ability of exact argumentation.

Brief outline of the course:
Formulation of linear and integer programs. Geometric solution. Simplex method, its correctness an finiteness. Duality and its economic interpretation. Dual and revised simplex method. Sensitivity analysis and parametric programming. Algorithms for integer programming: branch and bound, Gomory cuts. Computational complexity of LP and ILP. Solution of practical problems.

Recommended literature:
lms.upjs.sk - podklady k prednáškam a zadania úloh na cvičenia.
Plesník, Dupačová, Vlach: Lineárne programovanie, Alfa, Bratislava 1990
Ch. Papadimitriou – K. Steiglitz: Combinatorial Optimization: Algorithms and Complexity, 1984
R.J. Vanderbei, Linear Programming:Foundations and Extentions, Springer 2020, electronic version: http://www.princeton.edu/~rvdb/LPbook/

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 152

A	B	C	D	E	FX
21.71	17.11	20.39	20.39	17.11	3.29

Provides: prof. RNDr. Katarína Cechlárová, DrSc., RNDr. Adam Marton
Date of last modification: 17.04.2022
Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/LTM/10	**Course name:** Logic and set theory

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 3 / 2 **Per study period:** 42 / 28
Course method: present

Number of ECTS credits: 6

Recommended semester/trimester of the course: 5.

Course level: I., II.

Prerequisities: ÚMV/MANb/19 or ÚMV/FRPb/19 or ÚMV/MAN2b/22

Conditions for course completion:
Exam

Learning outcomes:
To obtain a basic knowledge on the mathematical notion of an infinity. Analysis of the notion of a proof.

Brief outline of the course:
Set as a mathematical formularization of an infinity. Properties of the set of reals. Relations and mappings.
Finite and countable sets. Cardinality of continuum. Elementary cardinal arithmetics.
Sentential calculus, an axiomatization. Completness Theorem. Methods of proofs. Language of predicate calculus, examples. Axiomatizations of predicate calculus and the notion of a proof. Methods of proofs in predicate calculus.

Recommended literature:
L. Bukovský: Teória množín, ES UPJŠ, Košice, 1984.
L. Bukovský: Množiny a všeličo okolo nich, ES UPJŠ, Košice, 2005.
L. Bukovský, Úvod do matematickej logiky, elektronický učebný text.
A. Sochor: Klasická matematická logika, Karolinum, Praha, 2001.
E. Mendelson, Introduction to Mathematical Logic, van Nostrand 1964.

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 270

A	B	C	D	E	FX
12.59	18.89	19.26	16.3	31.11	1.85

Provides: RNDr. Jaroslav Šupina, PhD., RNDr. Adam Marton

Date of last modification: 19.04.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ MAE/10	**Course name:** Macroeconomics

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

Number of ECTS credits: 4

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities:

Conditions for course completion:
The final mark is given based on the results of the tests written during the semester ("small" exams every week, two written exams checking the ability of computations) and oral exam, that evaluates the verbal argument about the studied models.

Learning outcomes:
The student understands the basic economic models and is able to use them to explain the real economic phenomena.

Brief outline of the course:
Basic macroekonomic notions: Gross domestic product, inflation, unemployment.. Analysis of godds markets. Financial markets. IS-LM model in closed economy. Open economy. IS-LM model in open economy. Models of labour market. Inflation and economic growth. High depth.

Recommended literature:
1. Olivier Blanchard, Alessia Amighini, Francesco Giavazzi, Macroeconomics, a European perspective, Pearson Education, 2010
2. N. Gregory Mankiw, Macroeconomics, 7th Edition, Harvard University, Worth Publishers 2009

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 85

A	B	C	D	E	FX
25.88	14.12	21.18	20.0	12.94	5.88

Provides: prof. RNDr. Katarína Cechlárová, DrSc.

Date of last modification: 17.04.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚMV/ MAN2c/10	**Course name:** Mathematical analysis III
Course type, scope and the method: **Course type:** Lecture / Practice **Recommended course-load (hours):** **Per week:** 2 / 2 **Per study period:** 28 / 28 **Course method:** present	
Number of ECTS credits: 5	
Recommended semester/trimester of the course: 3.	
Course level: I.	
Prerequisities: ÚMV/MANb/19	
Conditions for course completion: Two written test during semeter and activity student to practice. Final evaluation is given by continuous assessment, written and oral part of the exam.	
Learning outcomes: The purpose of the course is to provide introductory knowledge in Riemann integral calculus of real functions of one real variable and series of real functions. To develop computational skills in the field and extend the student ability to use this theory in applications. To teach the basic knowledge of the subject mater in the sylabus and develop the ability to use this theory.	
Brief outline of the course: Definite Riemann integral - definition, elementary properties, calculation methods, applications. Improper Riemann integral. Sequences and series of real functions – pointwise and uniform convergence, properties of the limit function and the sum. Power series, Taylor series and their applications.	
Recommended literature: 1. O. Hutník: Určitý integrál, UPJŠ, Košice, 2012 (in Slovak). 2. Brannan, D.: A First Course in Mathematical Analysis, Cambridge University Press, Cambridge 2006. 3. Bruckner, A. M. - Bruckner J. B. - Thomson, B. S.: Real Analysis, Second Edition, ClassicalRealAnalysis.com, 2008. 4. Zorich, V. A.: Mathematical Analysis I, Springer-Verlag 2002.	
Course language: Slovak	
Notes:	

Course assessment
Total number of assessed students: 213

A	B	C	D	E	FX
12.21	15.02	13.15	18.78	33.33	7.51

Provides: doc. RNDr. Ondrej Hutník, PhD., Mgr. Zuzana Ontkovičová, PhD.

Date of last modification: 21.11.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ MAN1d/10	**Course name:** Mathematical analysis IV

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 4 / 2 **Per study period:** 56 / 28
Course method: present

Number of ECTS credits: 7

Recommended semester/trimester of the course:

Course level: I.

Prerequisities: ÚMV/MAN1c/22 or ÚMV/MAN2c/22

Conditions for course completion:
exam

Learning outcomes:
Understanding of the basic rigorous ideas of Mathematical Analysis.

Brief outline of the course:
Metric spaces. Complete, compact and connected sets. Rings sigma-rings. Measure. Outer measure. Lebesgue measure. Measurable sets. Measurable functions. Legesgue integral. Lebesgue integral versus Riemann integral. Calculations of Lebesgue integrals. Applications.

Recommended literature:
B. S. Thomson, J. B. Bruckner, A. M. Bruckner: Elementary Real Analysis, Prentice Hall, 2001.
A. M. Bruckner, J. B. Bruckner, B. S. Thomson: Real Analysis, Prentice Hall, 1997.
T. Neubrunn, B. Riečan: Miera a integrál, Veda, Bratislava, 1981.
B. Riečan, T. Neubrunn: Teória miery, Veda, Bratislava, 1992.
G. S. Nelson, A User-Friendly Introduction to Lebesgue Measure and Integration, American Mathematical Society, 2015

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 99

A	B	C	D	E	FX
3.03	7.07	15.15	16.16	56.57	2.02

Provides: prof. RNDr. Jozef Doboš, CSc.

Date of last modification: 14.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ MAN2d/10	**Course name:** Mathematical analysis IV

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

Number of ECTS credits: 5

Recommended semester/trimester of the course: 4.

Course level: I.

Prerequisities: ÚMV/MANb/19

Conditions for course completion:
Continuous assessment is taken the form of two main tests during the semester. Final evaluation is given by continuous assessment (60%), written and oral part of the exam (40%).

Learning outcomes:
The student understands the basic concepts and their properties, which are defined in the content of the course. He has developed skills to use this theory in solving theoretical and practical problems. The student is able to do connections in solving problem tasks.

Brief outline of the course:
1. Function of several real variables - basic notions, limits and continuity. (3 weeks)
2. Differential calculus of functions of several real variables - partial derivative, differentiability, directional derivative, local and global extrema, constrained local extrema. (5 weeks)
3. Multivariable Riemann integral - definition, calculation methods, applications. (2 weeks)
4. Metric space - Euclidean space, topological properties of points and sets in metric space, completeness (3 weeks)

Recommended literature:
1. D. HUGHES-HALLETT et al.: Calculus, Wiley, 1998, ISBN 13 cloth 978-0470-88861-2.
2. B. S. Thomson, J. B. Bruckner, A. M. Bruckner: Elementary real analysis, Prentice Hall (Pearson), Lexington, 2008.

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 58

A	B	C	D	E	FX
27.59	17.24	24.14	13.79	15.52	1.72

Provides: RNDr. Lenka Halčinová, PhD.

Date of last modification: 26.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚMV/ MANb/19	**Course name:** Mathematical analysis of function of real variable

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 4 / 3 **Per study period:** 56 / 42
Course method: present

Number of ECTS credits: 8

Recommended semester/trimester of the course: 2.

Course level: I.

Prerequisities: ÚMV/FRPa/19

Conditions for course completion:
Two written tests during semeter and activity student to practice. Final evaluation is given by continuous assessment, written and oral part of the exam.

Learning outcomes:
The purpose of the course is to strengthen the knowledge in differential and integral calculus of real functions of one real variable and to develop computational skills in the field.

Brief outline of the course:
Limit and continuity of real functions, elementary functions. Differential calculus - derivatives of the first and of higher orders, the basic theorems of differential calculus and their use to investigate properties and behavior of functions.

Recommended literature:
1. Mihalíková, B. - Ohriska, J.: Matematická analýza I (elektronický učebný text), UPJŠ Košice, 2012.
2. Mihalíková, B. - Ohriska, J.: Matematická analýza II (skriptum), ES UPJŠ Košice, 2007.
3. Kluvánek, I. - Mišík, L. - Švec, M.: Matematika I, ALFA, Bratislava, 1971.
4. Demidovič, B. P.: Sbírka úloh a cvičení z matematické analýzy, Fragment, Praha, 2003.
5. Brannan, D.: A First Course in Mathematical Analysis, Cambridge University Press, Cambridge 2006.
6. Bruckner, A. M., Bruckner J. B., Thomson, B. S.: Real Analysis, Second Edition, ClassicalRealAnalysis.com, 2008.
7. Zorich, V. A.: Mathematical Analysis I, Springer-Verlag 2002.

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 335

A	B	C	D	E	FX
10.45	12.54	16.42	21.79	32.24	6.57

Provides: doc. RNDr. Ondrej Hutník, PhD., RNDr. Lenka Halčinová, PhD., RNDr. Jana Borzová, PhD.

Date of last modification: 17.04.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ MRUa/15	**Course name:** Mathematical problem solving strategies I

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 4.

Course level: I.

Prerequisities:

Conditions for course completion:
Deepening of knowledge and skills from the use of standard methods in solving mathematical problems in the thematic areas: Equations and inequalities and their systems, Elementary functions, Sequences, Financial mathematics. Developing the ability to explain different problem-solving strategies.
Assessment is given on the basis of the results of written examinations carried out during the semester (21 points) and active participation in exercises (3 points).
Classification scale:
A: 91 % - 100 %,
B: 81 % - 90 %,
C: 71 % - 80 %,
D: 61 % - 70 %,
E: 51 % - 60 %,
FX: 0 % - 50 %.

Learning outcomes:
The student is able to explain the basic concepts and methods of solving mathematical problems selected from various areas of school mathematics. The student is able to apply the acquired knowledge in finding and using various strategies for solving problems. The student will get acquainted with typical and more demanding tasks in school mathematics and with specific problems and misconceptions that occur in their solution in the teaching of mathematics in primary and secondary school.

Brief outline of the course:
1. - 5. Solving equations, inequalities and systems of equations (equations and inequalities with absolute values, equations with parameters, irrational equations and inequalities, exponential and logarithmic equations and inequalities, trigonometric equations and inequalities).
6. - 9. Concept of function, properties of elementary functions, graphs of functions.
10. - 11. Sequences, arithmetic and geometric sequences.
12. - 13. Tasks of financial mathematics.

Recommended literature:

Kubáček, Z., Černek, P., Žabka J. a kol.: Matematika a svet okolo nás, zbierka úloh. FMFI UK Bratislava, 2008
Kopka, J., Hrozny problémů ve školské matematice, Univerzita J. E. Purkyně, Ústí nad Labem,1999.
Lengyelfalusy, T., Kochol, M., Zábojníková, N.: Metódy riešenia matematických úloh 2. Žilinská univerzita v Žiline, 2009.
Učebnice a zbierky úloh z matematiky ZŠ a SŠ.

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 210

A	B	C	D	E	FX
30.48	22.86	22.86	11.43	11.43	0.95

Provides: doc. RNDr. Stanislav Lukáč, PhD.

Date of last modification: 12.01.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/MRUb/15	**Course name:** Mathematical problem solving strategies II

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities:

Conditions for course completion:
The resulting trial is granted on the basis of continuous assessment (on the results of written checks) and seminar work.

Learning outcomes:
Mastering the basic types of tasks and their methods of solving problems in primary and secondary school in the field of Planimetry, Stereometry and Goniometry.

Brief outline of the course:
Basic knowledge of school mathematics, various methods for the task, the role of mathematical competitions for thematic units Planimetry (4 w.), stereometry (3), goniometery (3).

Recommended literature:
[1] Hejný, M. a kol., Teória vyučovania matematiky 2. SPN, Bratislava 1989 (in Slovak)
[2] Kopka, J., Hrozny problémů ve školské matematice, Univerzita J. E. Purkyně, Ústí nad Labem 1999 (in Czech)
[3] Jonson-Wilder.S., Mason.J.: Developing thinking in Geometry, Sage, 2009
[4] Učebnice a zbierky úloh z matematiky ZŠ a SŠ

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 188

A	B	C	D	E	FX
31.91	30.32	25.0	8.51	4.26	0.0

Provides: doc. RNDr. Dušan Šveda, CSc.

Date of last modification: 19.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚMV/ MRUc/15	**Course name:** Mathematical problem solving strategies III

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 6.

Course level: I.

Prerequisities: ÚMV/MRUb/15

Conditions for course completion:
Conditions for continuous evaluation:
1. Participation in teaching in accordance with the study rules and instructions of the teacher.
2. Activity.
3. Homework and written test.
4. Conditions for successful completion of the course:
1. Participation in teaching in accordance with the study regulations and according to the instructions of the teacher;
2. Credits will be awarded to a student who scores at least 50% on homework assignments and at least 50% on written test. A grade of A requires at least 90%, a grade of B requires at least 80%, a grade of C requires at least 70%, a grade of D requires at least 60%, and a grade of E requires at least 50%.

Learning outcomes:
Students demonstrate a shift in different methods of problem-solving from combinatorics, probability and statistics. They will be aware of the connections between different methods of solution, and also the connections of these methods of solution with other topics of school mathematics.
While solving problems on written tests, the students will show that they have a conceptual understanding of the concepts of school combinatorics, probability and statistics. They are ready to use several methods of solving problems from these topics, they are able to consider whether a non-standard student's solution is correct or not, and they can explain this solution.

Brief outline of the course:
The content is focuses on different methods of problem-solving in combinatorics, probability and statistics. We are dealing with developing combinatorial, probabilistic and statistical thinking through different methods of problem-solving. The content of the course is based on current research results in this area.
In solving combinatorial problems, students are introduced to the components of the model of combinatorial thinking - the listing of possibilities, the counting process, and combinatorial formulas and methods, and the connections between these components.

When solving probability problems, we emphasize the different approaches to probability - statistical, classical, geometric, and subjective and their connections.
In part aimed at statistics, we focus on descriptive statistics and on the connection between probability and statistics.

Recommended literature:
Hecht, T., Sklenáriková, Z., Metódy riešenia matematických úloh, Bratislava, SPN, 1992. (in slovak)
Krantz, S.G., Techniques of Problem Solving, AMS, 1997.
Larson, L.C., Metódy riešenia matematických problémov, Bratislava, Alfa, 1990. (in slovak)
Učebnice a zbierky úloh pre stredné a základné školy.

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 195

A	B	C	D	E	FX
30.77	27.18	24.1	11.28	6.15	0.51

Provides: doc. RNDr. Ingrid Semanišinová, PhD.

Date of last modification: 07.02.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ MST/19	**Course name:** Mathematical statistics

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

Number of ECTS credits: 5

Recommended semester/trimester of the course:

Course level: I., II.

Prerequisities:

Conditions for course completion:
Total evaluation based on two written tests during the semester (2x40p) and the result of the written (30p) and oral part of the exam (30p).
At least 50% must be obtained from each part.
Final evaluation: ≥90% A; ≥80% B; ≥70% C; ≥60% D; ≥50% E; <50% FX.

Learning outcomes:
Student should obtain the knowledge about basic statistical methods and the ability to apply theoretical knowledge in practical problems solving.

Brief outline of the course:
1. Random vectors (definition, distributions, characteristics, joint and marginal distributions).
2. Covariance, correlation and regression.
3. Random sample, sampling distributions and characteristics.
4. Some important statistics and their distributions.
5. Point estimators and their properties.
6. Maximum likelihood method.
7. Interval estimates, confidence interval construction (2 weeks).
8. Testing of statistical hypothesis (critical region, level of significance and power of test, methods for searching optimal critical regions).
9. Some important parametric tests (2 weeks).
10. Some important nonparametric tests (2 weeks).

Recommended literature:
1. Skřivánková V.: Pravdepodobnosť v príkladoch, UPJŠ, Košice, 2006 (in Slovak)
2. Skřivánková V.-Hančová M.: Štatistika v príkladoch, UPJŠ, Košice, 2005 (in Slovak)
3. Casella, G., Berger, R., Statistical Inference, 2nd ed., Duxbury Press, 2002
4. DeGroot, M. H., Schervish, M. J.: Probability and Statistics, 4th ed., Pearson, Boston, 2012
5. Anděl J.: Základy matematické statistiky, MatfyzPress, Praha, 2011 (in Czech)

Course language:
Slovak

Notes:

Course assessment Total number of assessed students: 158					
A	B	C	D	E	FX
25.32	20.89	13.92	18.99	12.66	8.23
Provides: doc. RNDr. Martina Hančová, PhD.					
Date of last modification: 14.04.2022					
Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ MTM/14	**Course name:** Mathematics

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

Number of ECTS credits: 1

Recommended semester/trimester of the course:

Course level: I.

Prerequisities: ÚMV/MAN2c/10 and ÚMV/ALG2b/10 and ÚMV/ATC/10

Conditions for course completion:
Acquiring the required number of credits in the structure defined by the study plan.

Learning outcomes:
Evaluation of student‘s competences with respect to the profile of the graduate.

Brief outline of the course:

Recommended literature:

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 86

A	B	C	D	E	FX
31.4	19.77	22.09	17.44	9.3	0.0

Provides:

Date of last modification: 21.05.2016

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ SDFM1/15	**Course name:** Methods of Data Processing in Physics

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

Number of ECTS credits: 3

Recommended semester/trimester of the course: 3.

Course level: I.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:
1. Numerical processes and their errors. Particular properties of computer representation of numerical data. Introduction in Matlab/Octave.
2. Approximation and interpolation of a function. Algebraic multinomials. Newton, Lagrange, Hermit and spline interpolation. Selection of interpolation knots.
3. Numerical methods for calculation of definite integral – rectangular, trapezoidal, Simpson.
4. Numerical differentiation.
5. Numerical solution of ordinary differential equations – Euler's method and modifications, Runge-Kutta method.
6. Approximate solution of non-linear equations. Roots separation, simple iteration and its convergency. Tangent, secant and combined methods.
7. Iterative solution of linear system of algebraic equations, Gauss method.
8. Linear regression. Regression models, least-square criterion.
10. Non-linear regression models.
8. Basics of probability theory and mathematical statistics - systematic and random errors, Gaussian distribution, three-sigma rule, central limit theorem.
11. Computer simulation of real processes - Monte-Carlo method (principles, random quantities, pseudo-random number generators).
12. Simulation of particle transport through solid.

Recommended literature:
1. Buchanan J. L., Turner P. R.: Numerical Methods and Analysis. McGraw-Hill, Inc., New York, 1992.
2. Hrach R.: Počítačová fyzika I,II. Skriptum PF UJEP. Ed. stredisko UJEP, Ústí nad Labem, 2003.
3. Petrovič P., Nadrchal J., Petrovičová J.: Programovanie a spracovanie dát I, II. Edičné stredisko UPJŠ, Košice 1989.
4. Petrovič P.: Fyzika I – Vybrané kapitoly z klasickej fyziky a počítačovej fyziky. Vydavateľstvo equilibria, Košice, 2009.

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

Course language:
slovak, basics of english

Notes:

Course assessment
Total number of assessed students: 4

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

Provides: doc. RNDr. Erik Čižmár, PhD.

Date of last modification: 21.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ MFYU/15	**Course name:** Methods of Physical Problems Solving

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities:

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

Learning outcomes:
The student will gain the following knowledge and skills
1. overview of qualitative, quantitative and experimental methods of solving physical problems
2. can model a given physical problem and apply appropriate methods of solution according to the nature of the physical problem
3. can effectively use digital technologies on PC, mobile and tablet in solving physical problems.

Brief outline of the course:
Introduction to the subject
1. Overview of approaches, methods and means, sources of physical problems, competitions
Qualitative approaches in solving
2. Simple thought modeling and Fermi estimates,
3. Dimensional analysis, scaling
4. Application of symmetry and conservation laws
5. Graphic methods
Experiment and digital technologies in solving
6. Animations and simple simulations
(Geogebra, Phet, Workbench, Physlets)
7. Video analysis (Tracker), iconographic modeling (VnR, Coach)
8. Computer-aided, remote and virtual experiments (PC, tablet, mobile)
Quantitative approaches in solving
9. Models in the form of differential equations - computer modeling (Sage, Jupyter)
10. Symbolic and numerical solutions (Sage, Jupyter),
More advanced approaches to solutions
11. Qualitative approach through the theory of dynamical systems
12. Variational approaches (Lagrange, Hamilton)

13. 2D and 3D visualization and verification of solutions using a computer (Sage, Vpython)

Recommended literature:

1. Halliday, D., Resnick, R., Walker, J.: Fyzika 1-5, Akademické nakladatelství, VUTIUM, ISBN: 8021418680, 2007
2. Moore, T. A. Six Ideas that Shaped Physics: Units C, N, R, E, Q, T. 3rd ed., McGraw-Hill, Boston, 2017, http://www.physics.pomona.edu/sixideas/
3. Mahajan, S. The Art of Insight in Science and Engineering: Mastering Complexity. MIT Press, Boston, 2014.
4. Weinstein, L. Guesstimation: Solving Today's Problems on the Back of a Napkin. Princeton University Press Princeton, 2012.
5. Morin, D. Introduction to Classical Mechanics: With Problems and Solutions. Cambridge University Press. 2008
6. current information from web sites related to collections of physics problems and competitions, digital technologies for problem solving

Course language:
Slovak, English

Notes:

Course assessment
Total number of assessed students: 11

A	B	C	D	E	FX
81.82	9.09	9.09	0.0	0.0	0.0

Provides: doc. RNDr. Jozef Hanč, PhD.

Date of last modification: 27.01.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ MIE/13	**Course name:** Microeconomics

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

Number of ECTS credits: 4

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities:

Conditions for course completion:
Continuous assessment: feedback in MOODLE, small tests during tutorial (notions), two written exams (solving problems). Final oral exam: ability of verbal argumentation and graphical explanation of studied models.

Learning outcomes:
Understanding of basic principles of microeconomics and ability to apply them in practical situations.

Brief outline of the course:
Economics and economy. Supply and demand. Consumer Theory. Theory of firm. Perfect competition. Monopoly. Labour market. Market failure. Externalities and Public goods.

Recommended literature:
1. lms.upjs.sk: lectures, tutorials and other material
2. H.L. Varian, Intermediate Mikroekonomics, WW Norton, 1993
3. J.M. Perloff, Microeconomics, 6th Edtion, Addison Wesley, 2012
4. J. Sloman, Economics, 6th Edition, Prentice Hall, 2006

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 85

A	B	C	D	E	FX
24.71	23.53	17.65	18.82	12.94	2.35

Provides: prof. RNDr. Katarína Cechlárová, DrSc.

Date of last modification: 17.04.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ MTFM/20	**Course name:** Modern Trends in Physics
Course type, scope and the method: **Course type:** Lecture **Recommended course-load (hours):** **Per week:** 2 **Per study period:** 28 **Course method:** present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course: 4.	
Course level: I.	
Prerequisities:	
Conditions for course completion: To successfully complete the course (full-time, if necessary distance), the student must demonstrate a sufficient understanding of the basic concepts and laws of physics, which were focused on lectures, elaboration of semester work on specified topics and successful oral examination and written processing and presentation of one topic, which is in the content of the subject. Credit assessment takes into account the scope of teaching (2 hours of lectures and self-study 2 credits). Rating scale complied with 100-50 failed 49-0	
Learning outcomes: After completing the lectures and exercises, the student will have sufficient knowledge of those parts of physics that have been included in the content of lectures.	
Brief outline of the course: Week 1-3: Selected lectures in theoretical physics and astrophysics Week 4-6: Selected lectures in nuclear physics Weeks 7-9: Selected lectures in biophysics Week 10-12: Selected lectures on condensed matter physics Week 13.-14: Presentation of students' work and discussion.	
Recommended literature: The literature is specified at the beginning of the semester according to selected topics.	
Course language: english	
Notes: Presence form represents a standart form for the course, if a need arises, the course is performed using MS Teams.	

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

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: KPE/ MMKV/17	**Course name:** Multiculturalism and Multicultural Education

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 4.

Course level: I.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 191

A	B	C	D	E	FX
41.88	42.93	13.61	1.05	0.52	0.0

Provides: PaedDr. Michal Novocký, PhD.

Date of last modification: 20.06.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ TCS/10	**Course name:** Number theory

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

Number of ECTS credits: 3

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities: ÚMV/ATC/10

Conditions for course completion:
According to tests and exam.

Learning outcomes:
To obtain knowledge on quadratic congruences.

Brief outline of the course:
Chinese remainder theorem, Euler function, quadratic congruences, Pythagorean equation.

Recommended literature:
M. B. Nathanson: Elementary Methods in Number Theory. Springer, 2000.
H. E. Rose: A Course in Number Theory. Clarendon Press, Oxford, 1994.

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 104

A	B	C	D	E	FX
34.62	26.92	22.12	14.42	1.92	0.0

Provides:

Date of last modification: 03.05.2015

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: KPE/Pg/15	**Course name:** Pedagogy

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 3., 5.

Course level: I.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 961

A	B	C	D	E	FX
23.1	29.24	23.41	13.84	8.84	1.56

Provides: PaedDr. Michal Novocký, PhD.

Date of last modification: 20.06.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ ZFP1a/03	**Course name:** Physics Practical I

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

Number of ECTS credits: 3

Recommended semester/trimester of the course: 2.

Course level: I.

Prerequisities:

Conditions for course completion:
The active work during semester and hand in all reports.
Vindication of reports.

Learning outcomes:
Developing proper laboratory habits, skills and verify their theoretical knowledge.

Brief outline of the course:
The goal of this laboratory exercises is to familiarize the students with measurement methods, with kinds and calculus of mistakes, with measured results processing, and with presentation of results. The students gain practical skills, and verify their theoretical knowledge of first semester introductory physics course. They develop proper laboratory habits.
Laboratory assignment:
1. Density measurements of liquids and solids.
2. Radius measurements of spherical cap. Measurements of surface using planimeter.
3. Gravitational acceleration measurements using mathematical and physical pendulum.
4. Moment of inertia measurement using physical and torsion pendulum.
5. Measurements of Young's modulus.
6. Measurement of coefficient of viscosity.
7. Measurement of the speed of sound.
8. Measurements of general gas constant and Boltzmann constant.
9. Measurements of thermal expansivity of air.
10. Measurements of thermal capacity of matter.
11. Measurement of the surface tension.

Recommended literature:
Degro, J., Ješková, Z., Onderová, Ľ., Kireš, M.: Základné fyzikálne praktikum I. (Basic physical measurements I), Ed. PF UPJŠ Košice 2007.
Standards STN ISO 31. Slovenský inštitút normalizácie v Bratislave (Slovak institute of technical standards in Bratislava),1997.

Ješková, Z.: Computer based experiments in thermodynamics using IP COACH,ed. PF UPJŠ in Košice, 2004.

Course language:
english

Notes:

Course assessment
Total number of assessed students: 275

A	B	C	D	E	FX
57.45	25.82	12.73	3.27	0.73	0.0

Provides: doc. RNDr. Adriana Zeleňáková, PhD., doc. RNDr. Marián Kireš, PhD., doc. RNDr. Ján Füzer, PhD., doc. RNDr. Jozef Hanč, PhD.

Date of last modification: 29.03.2020

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ ZFP1b/03	**Course name:** Physics Practical II

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

Number of ECTS credits: 3

Recommended semester/trimester of the course: 3.

Course level: I.

Prerequisities: ÚFV/ZFP1a/03

Conditions for course completion:
To successfully complete the course, the student must measure at least 11 experimental tasks, process and analyze the measured results and evaluate the experimental results in the form of a protocol.
The condition for the implementation of another experimental task is the submission of a protocol from the previous exercise.
The condition for the implementation of the practical task is sufficient theoretical training at home. If the student is not ready for the task in advance, the teacher can send him home and the student must replace the exercise at another time.
The credit evaluation of the course takes into account the following student workload:
1 credit: self-study of recommended literature and subsequent direct teaching
1 credits: realization of experimental exercise and subsequent defense of measuring procedure - it is obligatory to complete all practical tasks in the semester,
1 credit: elaboration and submission of protocols from measurements, which are evaluated.

Learning outcomes:
By completing the course, the student will get acquainted with selected physical experiments in the field of electricity and magnetism and supplement the theoretical knowledge acquired in the course General Physics in a practical way.
The result of education is:
a) Complementing and summarizing knowledge and experimental skills in the field of electricity and magnetism.
b) Gaining practical experience with recording, analysis and interpretation of experimental data from practical measurements.
c) Gaining experience with the presentation of experimental results in the form of a measurement protocol.

Brief outline of the course:
Students on practical exercises are working in pairs experimental tasks in the field of electrical, electromagnetic and magnetic properties of matters.
1. Electrical Resistivity
2. Self - and Mutual Inductance and Capacity

3. Serial and Parallel Resonance
4. Thermal Dependence of Selected Electrical Phenomena in Solids
5. The Characteristics of Semiconductor Diod
6. The Characteristics of Semiconductor Bipolar Transistor
7. Magnetic Hysteresis
8. Hall Constant Measurements
9. Measurements of Horizontal Component of Earth Magnetic Field
10. Measuring characteristics of switching components
11. Measuring the properties of optoelectronic components
12. Electric current in liquids and electrolysis

Recommended literature:

1. Tumanski S, Handbook of magnetic measurements, CRC press, 2011.
2. Fiorillo F, Characterization and Measurement of Magnetic Materials, Elsevier, 2004.

Course language:
english

Notes:
Teaching is carried out in person. If necessary, part of the teaching can be realized remotely using the MS Teams or BBB tool. At the beginning of the semester, the teacher sets the conditions for completing and mastering the course.

Course assessment
Total number of assessed students: 249

A	B	C	D	E	FX
66.27	19.68	12.05	1.61	0.0	0.4

Provides: doc. RNDr. Adriana Zeleňáková, PhD., doc. RNDr. Ján Füzer, PhD.

Date of last modification: 30.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ ZFP1c/14	**Course name:** Physics Practical III

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

Number of ECTS credits: 3

Recommended semester/trimester of the course: 4.

Course level: I.

Prerequisities:

Conditions for course completion:
Measurements of experimental tasks, their evaluation in the form of a written report, which must be defended. As a part of evaluation there is is also a good theoretical preparation for the measurement of the task.

Learning outcomes:
To gain some physical inside into some of the concepts presented in the lectures. b. To gain some practice in data collection, analysis and interpretation of resumance. c. To gain experience and report writing presentation and results.

Brief outline of the course:
Oscilations. Pendulum. Composition and decomposition of oscillations. Resonance. The speed of sound. Refractive index. Lense's focal length. Interference. Diffraction. Diffraction and reflection of waves. Polarization. The speed of light. Quantum optics.

Recommended literature:
Degro,J., Ješková, Z., Onderová,Ľ., 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 fysikálních měření, SPN Praha, 1981.

Course language:
slovak, english

Notes:

Course assessment
Total number of assessed students: 94

A	B	C	D	E	FX
68.09	19.15	7.45	2.13	3.19	0.0

Provides: doc. RNDr. Marián Kireš, PhD., doc. RNDr. Ján Füzer, PhD.

Date of last modification: 01.02.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ ZFP1d/14	**Course name:** Physics Practical IV

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

Number of ECTS credits: 3

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities:

Conditions for course completion:
- a check of the theoretical preparation for measuring the given task
- tests for tasks no. 2 (2x), 4,5,6,8, tests from the theoretical part - basic characteristics of radiation and detectors, each test with a minimum success rate of 51%,
- measurement of tasks, elaboration and submission of protocols of measured tasks
- the overall evaluation is the sum of the evaluations of the individual tasks

Learning outcomes:
The student will acquire knowledge and practical skills about the registration of various types of ionizing radiation and verify the knowledge acquired in the subject General Physics IV - Atomic and Nuclear Physics.

Brief outline of the course:
1. Introduction to measurements.
2. Dosimetry measurements.
3. Statistic distribution of measured quantities.
4. Measurement time scale selection.
5. Absorption of beta rays.
6. Backward scattering of beta rays.
7. Scintillation gamma spectrometer.
8. Emulsion detector.
9. Franck Hertz experiment.
10. Beta - spectroscopy.
11. Energy dependence of the gamma-absorption coefficient.
12. MEDIPIX.
13. Interaction of photons with matter.

Recommended literature:
1. J.Vrláková, S.Vokál: Základné fyzikálne praktikum III, skriptá PF UPJŠ, Košice, 2012, dostupné
na
http://www.upjs.sk/public/media/5596/Zakladne-fyzikalne-praktikum-III.pdf

Course language:
slovak

Notes:

Course assessment
Total number of assessed students: 95

A	B	C	D	E	FX
83.16	8.42	5.26	3.16	0.0	0.0

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

Date of last modification: 23.08.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/FDE/15	**Course name:** Physics in Demonstration Experiments

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 3.

Course level: I.

Prerequisities:

Conditions for course completion:
Seminar work – a project dealing with hands-on experiments and their role in Physics teachig.

Learning outcomes:
The goal of the course is to get better the understanding of basic physical concepts and phenomena through demonstrational physical experiments.

Brief outline of the course:
The course is aimed at the conceptual understanding of basic physical concepts and phenomena with the help of selected demonstrational experiments. The experiments concern the content of the subject Introductory physics and their realization is based on students´ active participation.

Recommended literature:
1. D.Halliday, R.Resnick, J.Walker: Fyzika, VUTIUM, Brno, 2000
2.K.Cummings, P.W.Law, E.F.Redish, P.J.Cooney: Understanding Physics,
John Wiley & Sons, Inc., 2004
3.P.G.Hewitt: Conceptual Physics, tenth edition, Pearson, Addison Wesley, 2006
4.Ľ.Onderová, M.Kireš, Z.Ješková, J.Degro: Praktikum školských pokusov II, PF UPJŠ, 2004

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 42

A	B	C	D	E	FX
90.48	2.38	4.76	2.38	0.0	0.0

Provides: doc. RNDr. Marián Kireš, PhD.

Date of last modification: 15.04.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: KPPaPZ/PP/15	**Course name:** Positive Psychology

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

Number of ECTS credits: 2

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

Course level: I.

Prerequisities:

Conditions for course completion:
Assessment is based on interim evaluation. The subject will be taught in both present and distance format. Up-to-date information concerning the subject for the given academic year can be found on the electronic board of the subject in the Academic information system of the UPJŠ.

Learning outcomes:
Students will acquire basic knowledge concerning the reasons for founding Positive psychology, its main theory, current research, as well as application of Positive psychology as a new and rapidly developing field within psychology. Students will also gain experience in applying critical thinking to the challenges and issues that Positive psychology brings and raises in the context of the individual in contemporary society. Emphasis is placed on the ability to critically evaluate current topics of positive psychology.

Brief outline of the course:
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, Hwestone, M: Emotion and Motivation, Blackwell, 2004
Deci, E., Ryan R. M., Handbook of Self – Determination Reasearch, Rochester, 2002
Křivohlavý, J.: Pozitivní psychologie. Praha, Portál, 2003
Křivohlavý, J.: Psychologie vděčnosti a nevděčnosti. Praha, Grada, 2007
Křivohlavý, J.: Psychologie moudrosti a dobrého života, Praha, Grada, 2012

Křivohlavý, J.: Psychologie pocitu štěstí, Grada, 2013
McAdams, D. P., The Person, New York, 2002
Seligman, M. E. P., & Csikszentmihalyi, M. (Eds.). (2000). Positive psychology [Special issue] American Psychologist, 55(1).
Říčan, P.: Psychologie náboženství a spirituality, Praha, Portál, 2007
Slezáčková, A.:Pruvodce pozitivní psychologií, Praha, Grada, 2012

Course language:

Notes:

Course assessment
Total number of assessed students: 408

A	B	C	D	E	FX
98.28	1.23	0.25	0.0	0.25	0.0

Provides: Mgr. Jozef Benka, PhD.

Date of last modification: 24.06.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚMV/ TPP/19	**Course name:** Probability theory

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

Number of ECTS credits: 5

Recommended semester/trimester of the course: 4.

Course level: I.

Prerequisities: ÚMV/MAN1c/22 or ÚMV/MAN2c/22 or ÚMV/FRPa/19

Conditions for course completion:
To obtain at least 50% in two written tests during the semester.
Total evaluation based on written tests and oral exam.

Learning outcomes:
To obtain knowledge of the axiomatic theory of probability, random variables and their characteristics, special types of distributions and their applications.

Brief outline of the course:
Probability space, definitions and properties of probability.
Conditional probability and independence.
Random variables, their distribution function and characteristics.
Mean, variance and skewness.
Discrete and absolutely continuous distributions.
Quantile and characteristic functions, their properties. Relation between characteristic function and moments. Median and mode.
Transformation of random variables.
Special types of distributions with applications (binomial, Poisson, geometric, uniform, exponential, normal, chi-square, Student, Fisher).
Central limit theorem.

Recommended literature:
1. Skřivánková V.: Pravdepodobnosť v príkladoch, UPJŠ, Košice, 2006 (in Slovak)
2. DeGroot, M. H., Schervish, M. J.: Probability and Statistics, 4th ed., Pearson, Boston, 2012
3. Evans, M. J., Rosenthal, J. S.: Probability and Statistics: The Science of Uncertainty, 2nd Ed., W. H. Freeman, 2009
4. Riečan et al.: Pravdepodobnosť a matematická štatistika, Alfa, Bratislava, 1984 (in Slovak)
5. Potocký a kol.: Zbierka úloh z pravdepodobnosti a matematickej štatistiky, Alfa, Bratislava, 1991

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 359

A	B	C	D	E	FX
14.48	13.93	17.27	21.73	25.07	7.52

Provides: doc. RNDr. Daniel Klein, PhD., RNDr. Andrej Gajdoš, PhD.

Date of last modification: 27.01.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: KPPaPZ/Ps/15	**Course name:** Psychology

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 1., 3., 5.

Course level: I.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 749

A	B	C	D	E	FX
36.85	18.42	16.82	13.48	12.42	2.0

Provides: PhDr. Anna Janovská, PhD., Mgr. Ondrej Kalina, PhD.

Date of last modification: 24.06.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: KPPaPZ/PKŽ/15	**Course name:** Psychology of Everyday Life

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 3.

Course level: I.

Prerequisities:

Conditions for course completion:
The evaluation of the course and its subsequent completion will be based on clearly and objectively set requirements, which will be set in advance and will not change. The aim of the assessment is to ensure an objective and fair mapping of the student's knowledge while adhering to all ethical and moral standards. There is no tolerance for students' fraudulent behavior, whether in the teaching process or in the assessment process.
1. Active participation in seminars
2. Elaboration and presentation of PPT presentation on the assigned topic. Maximum number of points 20; minimum number of points 11.
3. Elaboration of an essay in the range of 4xA4 (standard pages). Maximum number of points 20; minimum number of points 11.
The final evaluation (grade) is the sum of points for the presentation and the essay.
A 40b - 37b
B 36b - 33b
C 32b - 29b
D 28b - 25b
E 24b - 21b
FX 20b - 0b

Learning outcomes:
The student is able to demonstrate an understanding of the individual's behavior in selected everyday situations such as conflict, group influence, empathy, helping, aggression, etc.
The student is able to describe, explain and evaluate the psychological mechanisms that occur in everyday situations.
The student is able to apply basic psychological knowledge to himself (self-regulation) but also in interaction with others (cooperation).
The method of teaching the subject will be oriented to the student. Speakers will be interested in the needs, expectations and opinions of students so as to encourage them to think critically by expressing respect and feedback on their opinions and needs.
The content of the curriculum will be based on primary and high-quality sources that will reflect the topicality of the topics so as to ensure the connection of the curriculum with other subjects and also

the connection of the curriculum with practice. Students will be expected to take an active approach in lectures and seminars with an emphasis on their independence and responsibility.

Brief outline of the course:
How to understand human behavior (overview of basic approaches in psychology); Basic overview of cognitive processes; Learning processes and their use in practice; Social influences, prosocial and antisocial behavior; How human emotions and motivations work; Deciding - why and when we take risks; Childhood experiences and their relationship to adulthood; Abnormal behavior, mental disorders and therapeutic approaches

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 208

A	B	C	D	E	FX
42.79	21.15	28.85	5.29	1.44	0.48

Provides: Mgr. Ondrej Kalina, PhD.

Date of last modification: 24.06.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/KVM/15	**Course name:** Quantum Mechanics I.

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 3 / 2 **Per study period:** 42 / 28
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities:

Conditions for course completion:
To successfully complete the course, the student must demonstrate sufficient understanding of the basics terms, concepts and applications of quantum physics. Knowledge of basic concepts is required from quantum physics at the level of their mathematical definition as well as their physical content and concrete applications. During the semester, the student must continuously master the content of the curriculum in order to gain the acquired knowledge, which he should actively and creatively use in solving specific tasks during exercises and complete continuous written tests taken into account in the overall evaluation of the subject. The condition for obtaining credits is passing 2 continuous written tests in exercises and an oral exam, which consists of one computational task and theoretical questions. The credit evaluation of the course takes into account the following student workload: direct teaching (2 credits), self-study (1 credit), individual consultations (1 credit) and assessment (1 credit). The minimum threshold for completing the course is to obtain at least 50% of the total score, using the following rating scale: A (90-100%), B (80-89%), C (70-79%), D (60-69%), E (50-59%), F (0-49%).

Learning outcomes:
After completing lectures and exercises, the student will have sufficient physical skills, knowledge and mathematical apparatus enabling independent solution of a wide range of traditional scientific problems in quantum physics. At the same time, he will gain an overview of the applications of quantum physics in various areas of physics such as nuclear physics, condensed matter physics, statistical physics, etc.

Brief outline of the course:
1. Subject of study, experimental and theoretical foundations of quantum mechanics (QM).
2. Wave formulation of QM. Postulate about wave function, superposition principle and postulate about operators.
3. Eigenvalues and eigenfunctions of operators. Measurement of quantities and reduction of wave function.
4. Time-independent and time-dependent Schrödinger equation. Ehrenfest equations and integrals of motion. A continuity equation.
5. Matrix formulation of QM, Dirac symbolism, calculation of mean values and density matrix.
6. Current immeasurability of physical quantities, Heisenberg uncertainty relations.

7. Solution of the Schrödinger equation for a particle in an infinitely deep potential well and a particle in the final 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: 40

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

Provides: doc. RNDr. Jozef Strečka, PhD.

Date of last modification: 19.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: KPE/ OLŠ/15	**Course name:** School Administration and Legislation

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 3., 5.

Course level: I.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 285

A	B	C	D	E	FX
45.61	29.82	14.39	6.32	3.16	0.7

Provides: PaedDr. Michal Novocký, PhD.

Date of last modification: 20.06.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚTVŠ/ ÚTVŠ/CM/13	**Course name:** Seaside Aerobic Exercise

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

Number of ECTS credits: 2

Recommended semester/trimester of the course:

Course level: I., II.

Prerequisities:

Conditions for course completion:
Completion: passed
Condition for successful course completion:
- active participation in line with the study rule of procedure and course guidelines
- effective performance of all tasks- aerobics, water exercise, yoga, Pilates and others

Learning outcomes:
Content standard:
The student demonstrates relevant knowledge and skills in the field, which content is defined in the course syllabus and recommended literature.
Performance standard:
Upon completion of the course students are able to meet the performance standard and:
- perform basic aerobics steps and basics of health exercises,
- conduct verbal and non-verbal communication with clients during exercise,
- organise and manage the process of physical recreation in leisure time

Brief outline of the course:
Brief outline of the course:
1. Basic aerobics – low impact aerobics, high impact aerobics, basic steps and cuing
2. Basics of aqua fitness
3. Basics of Pilates
4. Health exercises
5. Bodyweight exercises
6. Swimming
7. Relaxing yoga exercises
8. Power yoga
9. Yoga relaxation
10. Final assessment

Students can engage in different sport activities offered by the sea resort – swimming, rafting, volleyball, football, table tennis, tennis and other water sports in particular.

Recommended literature:
1. BUZKOVÁ, K. 2006. Fitness jóga. Praha: Grada. 167 s.

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

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 54

abs	n
11.11	88.89

Provides: Mgr. Agata Dorota Horbacz, PhD.

Date of last modification: 29.03.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: KF/ VKFV/07	**Course name:** Selected Topics in Philosophy of Education (General Introduction)
Course type, scope and the method: **Course type:** Practice **Recommended course-load (hours):** **Per week:** 2 **Per study period:** 28 **Course method:** present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course: 3., 5.	
Course level: I.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 16

A	B	C	D	E	FX
37.5	37.5	18.75	6.25	0.0	0.0

Provides: PhDr. Dušan Hruška, PhD.
Date of last modification: 13.04.2022
Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/VKA/10	**Course name:** Selected topics in algebra

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

Number of ECTS credits: 4

Recommended semester/trimester of the course: 6.

Course level: I.

Prerequisities:

Conditions for course completion:
According to tests and to the exam.

Learning outcomes:
To develop students' abstract thinking. Follow up on the acquired knowledge of algebra, expand it and generalize; be able to apply the acquired knowledge to specific examples. Demonstrate knowledge of mathematical content in context.

Brief outline of the course:
Relations, operations, algebraic structures.
Substructures.
Homomorphisms, isomorphisms.
Congruences, homomorphism theorems.
Terms, term operations, identities.

Recommended literature:
B. Jónsson: Topics in Universal Algebra, Springer-Verlag 1972
M. Kolibiar a kol.: Algebra a príbuzné disciplíny, Bratislava 1992
S.N. Burris and H.P. Sankappanavar: A Course in Universal Algebra 2000, http://www.math.uwaterloo.ca/~snburris/htdocs/ualg.html

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 72

A	B	C	D	E	FX
16.67	20.83	25.0	19.44	13.89	4.17

Provides: prof. RNDr. Danica Studenovská, CSc.

Date of last modification: 24.11.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ VEM/10	**Course name:** Selected topics in elementary mathematics

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

Number of ECTS credits: 3

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities: ÚMV/MAN2c/10

Conditions for course completion:
It is based on the results of written and oral exam.

Learning outcomes:
Obtain knowledge about the structure of elementary mathematics with respect to advanced mathematics; the development of mathematical skills of prospective teachers.

Brief outline of the course:
Theory of Equations and Inequalities, Solving Higher Order Polynomials, The Role of CAS systems in Solving Equations and Inequalities,
Building the Real Number System, Rational and Irrational Numbers, Farey Sequences, Review of Geometric Series: Preparation for Decimal Representation, Decimal Expansion, Decimal Periodicity, Building the Complex Numbers, Operating on the Complex Numbers, Picturing Complex Numbers and Connections to Transformation Geometry, The Polar Form of Complex Numbers and De Moivre's Theorem, Some Connections to Roots of Polynomials, Euler's Identity and the Irrationality of e,
Functions and Modeling, Ways of Representing Functions, Solutions of Cubic Equations Using Trigonometry

Recommended literature:
W.W. Esty: The Language of Mathematics, Montana State University, 2007.
F. Klein: Elementary mathematics from an advanced standpoint, Dower Publications, 1945.

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 45

A	B	C	D	E	FX
6.67	28.89	13.33	26.67	24.44	0.0

Provides: prof. RNDr. Jozef Doboš, CSc.

Date of last modification: 17.09.2021
Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚMV/ SHM/10	**Course name:** Seminar on history of mathematics

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 6.

Course level: I., II.

Prerequisities:

Conditions for course completion:
Conditions for continuous evaluation:
1. Participation in teaching in accordance with the study rules and instructions of the teacher.
2. Activity.
3. Homework and tests.
4. Seminar work and its presentation at the seminar – poster from history of mathematics on the selected topic
Conditions for successful completion of the course:
1. Participation in teaching in accordance with the study regulations and according to the instructions of the teacher;
2. Credits will be awarded to students who score at least 50% on homework assignments and tests. Additional points can be achieved for the presentation of a seminar paper.

Learning outcomes:
Students will demonstrate an understanding of the history of the development of some mathematical disciplines and selected concepts, and parallels between the phylogeny and ontogeny of mathematical thinking. They will demonstrate this understanding by scoring at least 50% on tests given at the beginning of the seminar on previous topics and on homework assignments.

Brief outline of the course:
Prehistory, ontogeny and phylogeny.
Mathematics in ancient cultures: Egypt, Mesopotamia, China, India.
Mathematics in ancient Greece: Origins of Greek natural philosophy and mathematics. The discovery of incommensurability and its consequences (Pythagoras and his school). Classical problems of Greek mathematics. Problems with infinity (Zeno). Eudoxus' method. Plato, Aristotle, Euclid and his Foundations. Archimedes of Syracuse, Eratosthenes, Apollónios, Claudios Ptolemy, Diophantos.
Arabic mathematics and its relation to medieval European mathematics.
The origins of modern mathematics. The search for the roots of polynomial equations. The origins of analytic geometry. Probability. Infinitesimal calculus. Number theory. Non-Euclidean geometry. The origin of set theory.
Development of mathematical symbolism.

Selected topics in school mathematics from the perspective of the history of mathematics.

Recommended literature:

Burton, D. M.: The History of Mathematics: An Introduction. McGraw−Hill, 2007.
Devlin, K.: Jazyk matematiky. Dokořán, 2002. (in czech)
Čižmár, J . Dejiny matematiky (Od najstarších čias po takmer súčasnosť) Perfekt, 2017. (in slovak)
Mareš , M . Příběhy matematiky. Pistorius, 2011. (in czech)

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 125

A	B	C	D	E	FX
72.0	12.0	8.8	3.2	3.2	0.8

Provides: doc. RNDr. Ingrid Semanišinová, PhD.

Date of last modification: 31.01.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚMV/ SMK/17	**Course name:** Seminar to mathematical clubs

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 6.

Course level: I.

Prerequisities:

Conditions for course completion:
Conditions for continuous evaluation:
1. Participation in teaching in accordance with the study rules and instructions of the teacher.
2. Activity.
3. Homework and written tests.
4. Seminar work and its presentation at the seminar - plan the selected topic for one math circle
Conditions for successful completion of the course:
1. Participation in teaching in accordance with the study regulations and according to the instructions of the teacher;
2. Credits will be awarded to a student who scores at least 50% on homework assignments, at least 50% on written tests, and at least 50% on a seminar work. A grade of A requires at least 90%, a grade of B requires at least 80%, a grade of C requires at least 70%, a grade of D requires at least 60%, and a grade of E requires at least 50%.

Learning outcomes:
While solving homework, the student will become familiar with different types of problems from mathematical competitions and demonstrate the ability to solve them with the mathematical apparatus of the student for whom the problem is intended.
While solving problems in written tests, the student will gain proficiency in solving problems from mathematical competitions such as Pythagorean and Mathematical Kangaroo.
The student will demonstrate in the seminar work that he/she can prepare the content of a mathematics circle that are motivating for his/her students.

Brief outline of the course:
The content is focuses on solving problems from mathematical competitions, and on familiarization with activities that will be motivating and fun for pupils and will develop their mathematical thinking
Students will also learn about the structure of mathematical competitions for middle and high school students and will be theoretically prepared for guiding mathematics circle.
The seminars focus on the following topics:
Number theory.
Equations, inequalities, inequalities.

Word problems.
Planimetry.
Stereometry.
Combinatorics. Dirichlet principle. Combinatorial geometry. Probability.
Mathematical games.

Recommended literature:

Acheson, D.: 1089 a další parádní čísla, Dokořán, 2006. (in czech)
Brožúry z edície Škola mladých matematikov. (in slovak)
Séria brožúr: XY. ročník matematickej olympiády. (in slovak)
Ziegler, G.M.: Matematika Vám to spočítá, Universum, Praha, 2011. (in czech)
Zhouf, J. a kol.: Matematické příběhy z korespondenčních seminářu, Prometheus, Praha, 2006. (in czech)

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 133

A	B	C	D	E	FX
57.14	20.3	12.03	7.52	3.01	0.0

Provides: doc. RNDr. Ingrid Semanišinová, PhD.

Date of last modification: 18.04.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: KPO/ SPKVV/15	**Course name:** Social and Political Context of Education

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

Number of ECTS credits: 2

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

Course level: I.

Prerequisities:

Conditions for course completion:
Evaluation of the developed assignment.
A ... 100,00% - 91,00%
B ... 90,99% - 81,00%
C ... 80,99% - 71,00%
D ... 70,99% - 61,00%
E ... 60,99% - 51,00%
FX ... 50,99% and less

Learning outcomes:
The aim and purpose of teaching the subject is to impart knowledge and promote reflection on the issues of education and training in the context of social and political change.
Development of knowledge: the student will be able to know the current theoretical background related to the process of education and training in a modern democratic society.
The student will be able to navigate the social and political space - politically, legally, socially and culturally. He/she will be able to look for alternatives and solutions to dysfunctions, while at the same time exploiting opportunities and ways to implement them.

Brief outline of the course:
The status, role and functions of education in human life and society. The political, social and economic objectives of education. Education, learning and social change in the context of globalisation. Macrosocial determinants of education. Current roles of education and training in modern performance and democratic society.

Recommended literature:
Domestic and foreign journal literature
Kudláčová, B.(2007) Človek a výchova v dejinách európskeho myslenia. Trnava: PdF TU
Zeus Leonardo (2010) Handbook of Cultural Politics and Education. Rotterdam, The Netherlands.

Course language:
Slovak

Notes:

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

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: KGER/ OJPV1/07	**Course name:** Specialised German Language - Natural Sciences 1

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 4.

Course level: I.

Prerequisities:

Conditions for course completion:
Active participation in class and completed homework assignments. Students are allowed to miss 2 classes at the most (2x90 min.). 1 control tests during the semester and written assignments. Final grade will be calculated as follows: A 93-100 %, B 86-92%, C 79-85%, D 72-78%, E 65-71%, FX 64 % and less.

Learning outcomes:
The development of students´ language skills - reading, writing, listening, speaking, improvement of their linguistic competence - students acquire knowledge of selected phonological, lexical and syntactic aspects, development of pragmatic competence - students can efectively use the language for a given purpose, with focus on Academic English and English for specific/professional purposes - Natural Science , level B1.

Brief outline of the course:

Recommended literature:
Duden Basiswissen Schule. Abitur: Enthält die Bände Mathematik, Physik, Chemie, Biologie, Geographie, Geschichte. (2007). ISBN: 978-3411002511.
Zettl, E. et al.: Aus moderner Technik und Naturwissenschaft. Ismaning: Hueber, 2003.
Reiss, K.: Basiswissen Zahlentheorie: Eine Einführung in Zahlen und Zahlbereiche (Mathematik für das Lehramt), Springer, 2007. ISBN: 978-3540453772.
Meyer, L., Schmidt, G.- D.: Basiswissen Ausbildung: Physik. Bildungsverlag EINS, 2008. ISBN: 978-3427799337.
Duden. Schülerduden Biologie: Das Fachlexikon von A-Z. Bibliographisches Institut Berlin, 2009. ISBN: 978-3411054275.
Mortimer, Ch. E., Müller, U., Beck, J.: Chemie: Das Basiswissen der Chemie. Stuttgart: Thieme, 2014. ISBN: 978-313484311
Deutsch perfekt, GEO, MaxPlanck Forschung a iné printové a elektronické médiá

Course language:
German

Notes:

Course assessment
Total number of assessed students: 147

A	B	C	D	E	FX
24.49	23.13	23.81	20.41	7.48	0.68

Provides: Mgr. Blanka Jenčíková

Date of last modification: 09.02.2023

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚTVŠ/ TVa/11	**Course name:** Sports Activities I.

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 1.

Course level: I., I.II., II.

Prerequisities:

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

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

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

Recommended literature:
BENCE, M. et al. 2005. Plávanie. Banská Bystrica: FHV UMB. 198s. ISBN 80-8083-140-8. [online] Dostupné na: https://www.ff.umb.sk/app/cmsFile.php?disposition=a&ID=571
BUZKOVÁ, K. 2006. Fitness jóga, harmonické cvičení těla I duše. Praha: Grada. ISBN 8024715252.
JARKOVSKÁ, H, JARKOVSKÁ, M. 2005. Posilování s vlastním tělem 417 krát jinak. Praha: Grada. ISBN 9788024757308.
KAČÁNI, L. 2002. Futbal:Tréning hrou. Bratislava: Peter Mačura – PEEM. 278s. ISBN 8089197027.

KRESTA, J. 2009. Futsal.Praha: Grada Publishing, a.s. 112s. ISBN 9788024725345.
LAWRENCE, G. 2019. Power jóga nejen pro sportovce. Brno: CPress. ISBN 9788026427902.
SNER, Wolfgang. 2004. Posilování ve fitness. České Budějovice: Kopp. ISBN 8072322141.
STACKEOVÁ, D. 2014. Fitness programy z pohledu kinantropologie. Praha: Galén. ISBN 9788074921155.
VOMÁČKO, S. BOŠTÍKOVÁ, S. 2003. Lezení na umělých stěnách. Praha: Grada. 129s. ISBN 8024721743.

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 14548

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

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

Date of last modification: 29.03.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚTVŠ/ TVb/11	**Course name:** Sports Activities II.

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 2.

Course level: I., I.II., II.

Prerequisities:

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

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

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

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

LAWRENCE, G. 2019. Power jóga nejen pro sportovce. Brno: CPress. ISBN 9788026427902.
SNER, Wolfgang. 2004. Posilování ve fitness. České Budějovice: Kopp. ISBN 8072322141.
STACKEOVÁ, D. 2014. Fitness programy z pohledu kinantropologie. Praha: Galén. ISBN 9788074921155.
VOMÁČKO, S. BOŠTÍKOVÁ, S. 2003. Lezení na umělých stěnách. Praha: Grada. 129s. ISBN 8024721743.

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 13211

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

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

Date of last modification: 29.03.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚTVŠ/ TVc/11	**Course name:** Sports Activities III.

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 3.

Course level: I., I.II., II.

Prerequisities:

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

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

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

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

LAWRENCE, G. 2019. Power jóga nejen pro sportovce. Brno: CPress. ISBN 9788026427902.
SNER, Wolfgang. 2004. Posilování ve fitness. České Budějovice: Kopp. ISBN 8072322141.
STACKEOVÁ, D. 2014. Fitness programy z pohledu kinantropologie. Praha: Galén. ISBN 9788074921155.
VOMÁČKO, S. BOŠTÍKOVÁ, S. 2003. Lezení na umělých stěnách. Praha: Grada. 129s. ISBN 8024721743.

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 8879

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

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

Date of last modification: 29.03.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚTVŠ/ TVd/11	**Course name:** Sports Activities IV.

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 4.

Course level: I., I.II., II.

Prerequisities:

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

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

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

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

LAWRENCE, G. 2019. Power jóga nejen pro sportovce. Brno: CPress. ISBN 9788026427902.
SNER, Wolfgang. 2004. Posilování ve fitness. České Budějovice: Kopp. ISBN 8072322141.
STACKEOVÁ, D. 2014. Fitness programy z pohledu kinantropologie. Praha: Galén. ISBN 9788074921155.
VOMÁČKO, S. BOŠTÍKOVÁ, S. 2003. Lezení na umělých stěnách. Praha: Grada. 129s. ISBN 8024721743.

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 5628

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

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

Date of last modification: 29.03.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ STA1N/15	**Course name:** Statistical Physics
Course type, scope and the method: **Course type:** Lecture / Practice **Recommended course-load (hours):** **Per week:** 2 / 2 **Per study period:** 28 / 28 **Course method:** present	
Number of ECTS credits: 4	
Recommended semester/trimester of the course: 6.	
Course level: I.	
Prerequisities: ÚFV/KVM/08 or ÚFV/KVM/15	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language: Slovak, English	
Notes:	

Course assessment
Total number of assessed students: 37

A	B	C	D	E	FX
37.84	29.73	16.22	8.11	8.11	0.0

Provides: prof. RNDr. Michal Jaščur, CSc., Mgr. Pavol Gajdoš, PhD.
Date of last modification: 02.04.2020
Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ SVL1/03	**Course name:** Structure and Properties of Solids

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

Number of ECTS credits: 5

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities:

Conditions for course completion:
For successful completing of the subject student after taking exam shows adequate knowledge from area of structure and properties of solids, After completing the subject student is able to continue with the lectures from the specialized courses like Magnetism, Low Temperature Physics, Structural analysis, Supercondutors etc. Credits evaluation takes into account taking part at the lectures - 2 credits, study of recommended literature -1 credit, exam - 2 credits. Minimal value to obtain evaluation is reach 50% of each evaluation (test and exam) points. Point ratio exam/test is 70/30. Evaluation scale is: A (90-100%), B (80-89%), C (70-79%), D (60-69%), E (50-59%), F (0-49%)

Learning outcomes:
After completing the lectures and taking the written test, the student will have a deep knowledge which allows her/him to find relationships between structure and physical properties of selected solids. Student is also able to continue with the lectures from the specialized courses like Magnetism, Low Temperature Physics, Structural analysis, Supercondutors etc.metals and also will have the ability to enter into a systematic theoretical and experimental solution of the problems of condenset mater physics.

Brief outline of the course:
Time schedule of the subject contents is updated in electronic board in AiS2 sw. The subject content is focused in the following main topics: Periodic array of atoms. Fundamental type of lattices. Index systems for crystal planes. Simple crystal structure. Symetry and crystal structure. Point and space groups. Crystal binding and elastic constants. Wave diffraction and the reciprocal lattice. X.ray diffractometry. Brag´s law, Laue conditions, scatering of x-rays, Neutrons and neutron scattering, CW - diffractometer, Ewald´s sphere, Diffraction on powder samples, Structure factor, Ocupation factor, Atomic displacement factor. Thermal properties. Phonon heat capacity, thermal conductivity. Free electron Fermi gas. Energy bands. Semiconductor crystals. Superconductivity.

Recommended literature:
1. V. Valvoda: Základy krystalografie, SPN Praha, 1982
2. Z.T. Durski: Podstawy krystalografii strukturalnej i rentgenovskej, PWN, 1994
3. V. Kavečanský: Fyzika tuhých látok, Košice 1983
4. CH. Kittel: Úvod do fyziky Pevných látek, Academia, Praha 1985.
5. W. D. Callister: Materials Science and Engineering, John Willey aand Sons, New York, 1994.

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

Course language:
English

Notes:
Lectures can be done at presence form or online using MS Teams. Education form is updated at the begining of the subject. All ppt presentations are accesible in LMS UPJŠ.

Course assessment
Total number of assessed students: 53

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

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

Date of last modification: 21.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ SVK/10	**Course name:** Students scientific conference

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

Number of ECTS credits: 4

Recommended semester/trimester of the course:

Course level: I., II.

Prerequisities:

Conditions for course completion:

Learning outcomes:
Individual scientific work of students. Publishing of obtained results in a written form and as a public presentation.

Brief outline of the course:

Recommended literature:
With respect to the research problematics (article in journals, books).

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 17

abs	n
100.0	0.0

Provides:

Date of last modification: 01.12.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

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

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 1.

Course level: I.

Prerequisities:

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

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

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

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

Recommended literature:

1. Carretero Gomez, S., Vuorikari, R. and Punie, Y., DigComp 2.1: The Digital Competence Framework for Citizens with eight proficiency levels and examples of use, Luxembourg, 2017, ISBN 978-92-79-68006-9, https://www.ecdl.sk/
2. Bruff, D. (2019). Intentional Tech: Principles to Guide the Use of Educational Technology in College Teaching (1st edition). Morgantown: West Virginia University Press.
3. Baker, Y. (2020). Microsoft Teams for Education. Amazon Digital Services.
4. Miller, H. (2021). Google Classroom + Google Apps: 2021 Edition. Brentford: Orion Edition Limited.

Course language:
slovak

Notes:

Course assessment
Total number of assessed students: 81

A	B	C	D	E	FX
45.68	3.7	7.41	0.0	43.21	0.0

Provides: doc. RNDr. Jozef Hanč, PhD.

Date of last modification: 26.01.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

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

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

Number of ECTS credits: 2

Recommended semester/trimester of the course:

Course level: I., II.

Prerequisities:

Conditions for course completion:
Completion: passed
Condition for successful course completion:
- active participation in line with the study rule of procedure and course guidelines
- effective performance of all tasks: carrying a canoe, entering and exiting a canoe, righting a canoe, paddling

Learning outcomes:
Content standard:
The student demonstrates relevant knowledge and skills in the field, which content is defined in the course syllabus and recommended literature.
Performance standard:
Upon completion of the course students are able to meet the performance standard and:
- implement the acquired knowledge in different situations and practice,
- implement basic skills to manipulate a canoe on a waterway,
- determine the right spot for camping,
- prepare a suitable material and equipment for camping.

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

11. Capsizing
12. Commands

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

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 209

abs	n
37.32	62.68

Provides: Mgr. Dávid Kaško, PhD.

Date of last modification: 29.03.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ TMEU/15	**Course name:** Theoretical Mechanics

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

Number of ECTS credits: 3

Recommended semester/trimester of the course: 3.

Course level: I.

Prerequisities: ÚFV/VF1a/12

Conditions for course completion:
To successfully complete the course, the student must demonstrate sufficient understanding of all basic concepts and applications of theoretical mechanics. Knowledge of basic concepts at the level of their mathematical definition is required, as well as their physical content and principled applications. The student must be able to actively master the content of the curriculum continuously during the semester, so that he can actively and creatively use the acquired knowledge in solving specific problems in exercises and independent homework. In addition to direct participation in teaching, the student is obliged to independently study professional topics assigned by the teacher and also to develop and present one home assignments. The condition for obtaining credits is, in addition to participation in teaching, also the successful completion of the two written tests from exercises and lectures and the elaboration of home assignments. The minimum limit for passing the exam is to obtain 51% of the total score, which takes into account all required activities with relevant weight.
Rating scale: A - 91% - 100% points, B - 81% - 90% points, C - 71% - 80% points, D - 61% -70% points, E - 51% - 60% points.

Learning outcomes:
The lecture on Theoretical Mechanics is the first lecture of an extensive university course in theoretical physics, where the student gets acquainted with fundamental theoretical concepts (e.g., generalized coordinates, velocities and momentum, phase space, Hamiltonian Lagrangian ...), which constitute the basis for understanding advanced theoretical methods of advanced courses such as quantum mechanics, statistical physics and quantum field theory. For this reason, attending this lecture is essential for all physics students. In addition to deep physical knowledge, students will also gain practical experience in solving complex problems of mechanics of systems of mass points and mechanics of a rigid body.

Brief outline of the course:
1. Dynamics of a free system of mass points.
2. Motion of a constrained system of mass points. Constrains and their classification. The principle of virtual work and search for equilibrium positions.
3. D'Alembert's principle. Lagrange equations of the first kind. Generalized coordinates and generalized forces.

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

Recommended literature:

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

Course language:
Slovak, English

Notes:

Course assessment
Total number of assessed students: 44

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

Provides: prof. RNDr. Michal Jaščur, CSc.

Date of last modification: 20.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: KPE/ TVE/08	**Course name:** Theory of Education

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

Number of ECTS credits: 2

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

Course level: I.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 631

A	B	C	D	E	FX
43.11	31.22	16.8	5.07	1.74	2.06

Provides: Mgr. Katarína Petríková, PhD.

Date of last modification: 20.06.2022

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ TEP1/03	**Course name:** Theory of the Electromagnetic Field

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 3 / 1 **Per study period:** 42 / 14
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 4.

Course level: I.

Prerequisities: ÚFV/VFM1b/15 or ÚFV/VF1b/03

Conditions for course completion:
To successfully complete the course, the student must demonstrate sufficient understanding of the basics terms, concepts and applications of electromagnetic field theory. Knowledge of basic concepts is required at the level of their mathematical definition, as well as their physical content and specific applications. During the semester, the student must continuously master the content of the curriculum so that he can actively and creatively use the acquired knowledge in solving specific tasks during the exercises and pass continuous written tests taken into account in the overall evaluation of the subject. The condition for obtaining credits is passing 2 continuous written tests in exercises and an oral exam, which consists of theoretical questions covering the entire scope of the course. The credit evaluation of the course takes into account the following student workload: direct teaching (2 credits), self-study (1 credit), individual consultations (1 credit) and assessment (1 credit). The minimum threshold for completing the course is to obtain at least 50% of the total score, using the following rating scale: A (90-100%), B (80-89%), C (70-79%), D (60- 69%), E (50-59%), F (0-49%).

Learning outcomes:
After completing lectures and exercises, the student will have sufficient physical skills, knowledge and mathematical apparatus enabling independent solution of a wide range scientific problems in electromagnetic field theory. The student also gets an overview of applications of electromagnetic field theory in various fields of physics such as electricity, magnetism, optics, etc.

Brief outline of the course:
1. Charge density and current density. Continuity equation. Definition of electromagnetic field.
2. System of Maxwell's equations in vacuum: differential formulation of Gauss' law of electrostatics, law of total current. The absence of magnetic monopoles and the law of electromagnetic induction.
3. Scalar and vector potential, gauge transformation. Wave equations for potentials. Energy conservation law in electromagnetic field theory: Poynting vector.
4. Conservation law of momentum of electromagnetic field: Maxwell's stress tensor.
5. Electrostatic field in vacuum and its potential. Potential of charges distributed in space and on surfaces. Boundary conditions on a charged area.

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

Recommended literature:

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

Course language:

1. Slovak,
2. English

Notes:

Course assessment

Total number of assessed students: 330

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

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

Date of last modification: 19.09.2021

Approved: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Stanislav Lukáč, PhD.