

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                      |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                      |
| <b>Course ID:</b> CJP/<br>PFAJAKA/07                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Course name:</b> Academic English |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 <b>Per study period:</b> 28<br><b>Course method:</b> combined, present                                                                                                                                                                                                                                                                                                              |                                      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                      |
| <b>Recommended semester/trimester of the course:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                      |
| <b>Course level:</b> I., II., N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                      |
| <b>Conditions for course completion:</b><br>kontrolný písomný test, aktivita na hodine<br>záverečný písomný test<br>miniprezentácie na dané témy<br>povolené max. 2 absencie<br>stupnica hodnotenia: A 93-100, B 86-92, C 79-85, D 72-78, E 65-71, FX 64 a menej<br>aktivita na hodine<br>predmet končí hodnotením                                                                                                                                                                                                             |                                      |
| <b>Learning outcomes:</b><br>Osvojenie si a rozvíjanie užitočných techník akademického písomného ako aj ústneho prejavu so zameraním na rozvoj jazykových kompetencií študenta, na upevňovanie a rozvíjanie všetkých jazykových zručností na stredne pokročilej úrovni ovládania jazyka (B2) podľa Spoločného európskeho referenčného rámca pre jazyky). Predmet kladie dôraz na používanie angličtiny v akademickom prostredí.                                                                                                |                                      |
| <b>Brief outline of the course:</b><br>Akademická angličtina a jej charakteristiky<br>Čítanie odborných článkov, analýza, parafrázovanie<br>Spájacie slová v akademickom písaní<br>Formálna a neformálna angličtina a ich črty<br>Vyjadrovanie príčiny, následku v akademickom jazyku<br>Čítanie odbornej publikácie, analýza, parafrázovanie<br>Slovo tvorba v anglickom jazyku- predpony a prípony<br>Ako prezentovať v angličtine<br>Parafrázovanie a definovanie<br>Ako písať abstrakt<br>Slovosled v akademickom diškurze |                                      |
| <b>Recommended literature:</b><br>Seal B.: Academic Encounters, CUP, 2002<br>T. Armer :Cambridge English for Scientists, CUP 2011<br>M. McCarthy M., O'Dell F. - Academic Vocabulary in Use, CUP 2008                                                                                                                                                                                                                                                                                                                          |                                      |

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| Zemach, D.E, Rumisek, L.A: Academic Writing, Macmillan 2005<br>Olsen, A. : Active Vocabulary, Pearson, 2013<br>www.bbclearningenglish.com<br>Cambridge Academic Content Dictionary, CUP, 2009 |       |       |       |      |       |
| <b>Course language:</b>                                                                                                                                                                       |       |       |       |      |       |
| <b>Notes:</b>                                                                                                                                                                                 |       |       |       |      |       |
| <b>Course assessment</b><br>Total number of assessed students: 295                                                                                                                            |       |       |       |      |       |
| A                                                                                                                                                                                             | B     | C     | D     | E    | FX    |
| 28.81                                                                                                                                                                                         | 22.37 | 16.27 | 11.53 | 8.14 | 12.88 |
| <b>Provides:</b> PaedDr. Gabriela Bednáriková                                                                                                                                                 |       |       |       |      |       |
| <b>Date of last modification:</b> 06.09.2016                                                                                                                                                  |       |       |       |      |       |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                              |       |       |       |      |       |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                      |       |                               |       |       |       |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                         |       |                               |       |       |       |
| <b>Course ID:</b> ÚMV/<br>ALGa/10                                                                                                                                                                                          |       | <b>Course name:</b> Algebra I |       |       |       |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 3 / 3 <b>Per study period:</b> 42 / 42<br><b>Course method:</b> present |       |                               |       |       |       |
| <b>Number of credits:</b> 7                                                                                                                                                                                                |       |                               |       |       |       |
| <b>Recommended semester/trimester of the course:</b> 1.                                                                                                                                                                    |       |                               |       |       |       |
| <b>Course level:</b> I.                                                                                                                                                                                                    |       |                               |       |       |       |
| <b>Prerequisites:</b>                                                                                                                                                                                                      |       |                               |       |       |       |
| <b>Conditions for course completion:</b><br>According to the results from the semester and in view of the results of the written and oral final exam..                                                                     |       |                               |       |       |       |
| <b>Learning outcomes:</b><br>To obtain basic knowledge from number theory concerning divisibility and from linear algebra concerning systems of linear equations. To be able to apply it in concrete excercises.           |       |                               |       |       |       |
| <b>Brief outline of the course:</b><br>Divisibility in $\mathbb{Z}$ . Fields. Systems of linear equations, Gauss elimination. Maps, permutations. Computing with matrices. Determinants, Cramer rule.                      |       |                               |       |       |       |
| <b>Recommended literature:</b><br>T.S Blyth, E.F. Robertson: Basic linear algebra, Springer Verlag, 2001.<br>K. Jänich: Linear algebra, Springer Verlag, 1991.                                                             |       |                               |       |       |       |
| <b>Course language:</b><br>Slovak                                                                                                                                                                                          |       |                               |       |       |       |
| <b>Notes:</b>                                                                                                                                                                                                              |       |                               |       |       |       |
| <b>Course assessment</b><br>Total number of assessed students: 1250                                                                                                                                                        |       |                               |       |       |       |
| A                                                                                                                                                                                                                          | B     | C                             | D     | E     | FX    |
| 10.8                                                                                                                                                                                                                       | 11.12 | 17.6                          | 17.76 | 29.68 | 13.04 |
| <b>Provides:</b> prof. RNDr. Danica Studenovská, CSc., RNDr. Igor Fabrici, Dr. rer. nat., Mgr. Martina Sabová, RNDr. Miroslava Černegová, Mgr. Jana Chudá, RNDr. Anna Mišková                                              |       |                               |       |       |       |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                               |       |                               |       |       |       |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                           |       |                               |       |       |       |

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                                                                  |       |       |       |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                                                                  |       |       |       |
| <b>Course ID:</b> ÚMV/<br>ALG3b/10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      | <b>Course name:</b> Algebra II for informaticians and physicists |       |       |       |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 4 / 2 <b>Per study period:</b> 56 / 28<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                                            |      |                                                                  |       |       |       |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                                                                  |       |       |       |
| <b>Recommended semester/trimester of the course:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |                                                                  |       |       |       |
| <b>Course level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                                                                  |       |       |       |
| <b>Prerequisites:</b> ÚMV/ALGa/10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                                                                  |       |       |       |
| <b>Conditions for course completion:</b><br>Exam                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |                                                                  |       |       |       |
| <b>Learning outcomes:</b><br>To provide deeper knowledge on vector spaces, linear transformations and Euclidean spaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |                                                                  |       |       |       |
| <b>Brief outline of the course:</b><br>Vector spaces, subspaces. A basis, a dimension and a characterization of n-dimensional vector spaces. The rank of a matrix. Linear transformations and their matrices. Operations with linear transformations, matrices of sums and compositions of linear transformations. Regular linear transformations, regular matrices. Similar matrices. Characteristic vectors and characteristic values of linear transformations.<br>Affine spaces, subspaces and their positions. Euclidean spaces, the distance of subspaces. Conics and quadrics. |      |                                                                  |       |       |       |
| <b>Recommended literature:</b><br>A. F. Beardon: Algebra and Geometry, Cambridge University Press, 2005<br>G. Birkhoff, S. Mac Lane: A Survey of Modern Algebra, New York 1965                                                                                                                                                                                                                                                                                                                                                                                                        |      |                                                                  |       |       |       |
| <b>Course language:</b><br>Slovak                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                                                                  |       |       |       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                                                                  |       |       |       |
| <b>Course assessment</b><br>Total number of assessed students: 284                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                                                                  |       |       |       |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | B    | C                                                                | D     | E     | FX    |
| 9.86                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 7.75 | 9.86                                                             | 14.44 | 42.61 | 15.49 |
| <b>Provides:</b> doc. RNDr. Roman Soták, PhD., Mgr. Mária Janicová, Mgr. Jana Chudá                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |                                                                  |       |       |       |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                                                                  |       |       |       |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |                                                                  |       |       |       |

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                              |     |                              |     |     |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                 |     |                              |     |     |     |
| <b>Course ID:</b> ÚFV/<br>BSSF/15                                                                                                                                                  |     | <b>Course name:</b> anglický |     |     |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b><br><b>Recommended course-load (hours):</b><br><b>Per week: Per study period:</b><br><b>Course method:</b> present |     |                              |     |     |     |
| <b>Number of credits:</b> 4                                                                                                                                                        |     |                              |     |     |     |
| <b>Recommended semester/trimester of the course:</b>                                                                                                                               |     |                              |     |     |     |
| <b>Course level:</b> I.                                                                                                                                                            |     |                              |     |     |     |
| <b>Prerequisites:</b>                                                                                                                                                              |     |                              |     |     |     |
| <b>Conditions for course completion:</b>                                                                                                                                           |     |                              |     |     |     |
| <b>Learning outcomes:</b>                                                                                                                                                          |     |                              |     |     |     |
| <b>Brief outline of the course:</b>                                                                                                                                                |     |                              |     |     |     |
| <b>Recommended literature:</b>                                                                                                                                                     |     |                              |     |     |     |
| <b>Course language:</b>                                                                                                                                                            |     |                              |     |     |     |
| <b>Notes:</b>                                                                                                                                                                      |     |                              |     |     |     |
| <b>Course assessment</b><br>Total number of assessed students: 6                                                                                                                   |     |                              |     |     |     |
| A                                                                                                                                                                                  | B   | C                            | D   | E   | FX  |
| 66.67                                                                                                                                                                              | 0.0 | 33.33                        | 0.0 | 0.0 | 0.0 |
| <b>Provides:</b>                                                                                                                                                                   |     |                              |     |     |     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                       |     |                              |     |     |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                   |     |                              |     |     |     |

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                              |                                     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                 |                                     |
| <b>Course ID:</b> ÚFV/<br>ZPF1b/03                                                                                                                                                 | <b>Course name:</b> Bachelor thesis |
| <b>Course type, scope and the method:</b><br><b>Course type:</b><br><b>Recommended course-load (hours):</b><br><b>Per week: Per study period:</b><br><b>Course method:</b> present |                                     |
| <b>Number of credits:</b> 6                                                                                                                                                        |                                     |
| <b>Recommended semester/trimester of the course:</b> 6.                                                                                                                            |                                     |
| <b>Course level:</b> I.                                                                                                                                                            |                                     |
| <b>Prerequisites:</b>                                                                                                                                                              |                                     |
| <b>Conditions for course completion:</b>                                                                                                                                           |                                     |
| <b>Learning outcomes:</b>                                                                                                                                                          |                                     |
| <b>Brief outline of the course:</b>                                                                                                                                                |                                     |
| <b>Recommended literature:</b>                                                                                                                                                     |                                     |
| <b>Course language:</b>                                                                                                                                                            |                                     |
| <b>Notes:</b>                                                                                                                                                                      |                                     |
| <b>Course assessment</b><br>Total number of assessed students: 65                                                                                                                  |                                     |
| abs                                                                                                                                                                                | n                                   |
| 100.0                                                                                                                                                                              | 0.0                                 |
| <b>Provides:</b>                                                                                                                                                                   |                                     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                       |                                     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                   |                                     |

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                              |                                     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                 |                                     |
| <b>Course ID:</b> ÚFV/<br>ZPF1a/03                                                                                                                                                 | <b>Course name:</b> Bachelor Thesis |
| <b>Course type, scope and the method:</b><br><b>Course type:</b><br><b>Recommended course-load (hours):</b><br><b>Per week: Per study period:</b><br><b>Course method:</b> present |                                     |
| <b>Number of credits:</b> 2                                                                                                                                                        |                                     |
| <b>Recommended semester/trimester of the course:</b> 5.                                                                                                                            |                                     |
| <b>Course level:</b> I.                                                                                                                                                            |                                     |
| <b>Prerequisites:</b>                                                                                                                                                              |                                     |
| <b>Conditions for course completion:</b>                                                                                                                                           |                                     |
| <b>Learning outcomes:</b>                                                                                                                                                          |                                     |
| <b>Brief outline of the course:</b>                                                                                                                                                |                                     |
| <b>Recommended literature:</b>                                                                                                                                                     |                                     |
| <b>Course language:</b>                                                                                                                                                            |                                     |
| <b>Notes:</b>                                                                                                                                                                      |                                     |
| <b>Course assessment</b><br>Total number of assessed students: 66                                                                                                                  |                                     |
| abs                                                                                                                                                                                | n                                   |
| 100.0                                                                                                                                                                              | 0.0                                 |
| <b>Provides:</b>                                                                                                                                                                   |                                     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                       |                                     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                   |                                     |

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                              |     |                                                     |     |     |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                 |     |                                                     |     |     |     |
| <b>Course ID:</b> ÚFV/<br>BPO/14                                                                                                                                                   |     | <b>Course name:</b> Bachelor Thesis and its Defence |     |     |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b><br><b>Recommended course-load (hours):</b><br><b>Per week: Per study period:</b><br><b>Course method:</b> present |     |                                                     |     |     |     |
| <b>Number of credits:</b> 4                                                                                                                                                        |     |                                                     |     |     |     |
| <b>Recommended semester/trimester of the course:</b>                                                                                                                               |     |                                                     |     |     |     |
| <b>Course level:</b> I.                                                                                                                                                            |     |                                                     |     |     |     |
| <b>Prerequisites:</b>                                                                                                                                                              |     |                                                     |     |     |     |
| <b>Conditions for course completion:</b><br>Required number of credits gained based on submitting the bachelor thesis.                                                             |     |                                                     |     |     |     |
| <b>Learning outcomes:</b>                                                                                                                                                          |     |                                                     |     |     |     |
| <b>Brief outline of the course:</b><br>Presentation of the bachelor thesis results, answering questions of the reviewer and members of professional commission.                    |     |                                                     |     |     |     |
| <b>Recommended literature:</b>                                                                                                                                                     |     |                                                     |     |     |     |
| <b>Course language:</b><br>Slovak or English                                                                                                                                       |     |                                                     |     |     |     |
| <b>Notes:</b>                                                                                                                                                                      |     |                                                     |     |     |     |
| <b>Course assessment</b><br>Total number of assessed students: 7                                                                                                                   |     |                                                     |     |     |     |
| A                                                                                                                                                                                  | B   | C                                                   | D   | E   | FX  |
| 100.0                                                                                                                                                                              | 0.0 | 0.0                                                 | 0.0 | 0.0 | 0.0 |
| <b>Provides:</b>                                                                                                                                                                   |     |                                                     |     |     |     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                       |     |                                                     |     |     |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                   |     |                                                     |     |     |     |

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                   |     |                                          |     |     |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                      |     |                                          |     |     |     |
| <b>Course ID:</b> ÚFV/<br>SBF/12                                                                                                                                                                        |     | <b>Course name:</b> Biophysical Seminary |     |     |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 <b>Per study period:</b> 28<br><b>Course method:</b> present |     |                                          |     |     |     |
| <b>Number of credits:</b> 2                                                                                                                                                                             |     |                                          |     |     |     |
| <b>Recommended semester/trimester of the course:</b> 5.                                                                                                                                                 |     |                                          |     |     |     |
| <b>Course level:</b> I.                                                                                                                                                                                 |     |                                          |     |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                   |     |                                          |     |     |     |
| <b>Conditions for course completion:</b><br>The active presence on the seminars.                                                                                                                        |     |                                          |     |     |     |
| <b>Learning outcomes:</b><br>Students will obtain informations about scientific results of research groups from Department of biophysics.                                                               |     |                                          |     |     |     |
| <b>Brief outline of the course:</b><br>Contents is determined by the lectures and varies every year.                                                                                                    |     |                                          |     |     |     |
| <b>Recommended literature:</b><br>Selected scientific journals.                                                                                                                                         |     |                                          |     |     |     |
| <b>Course language:</b>                                                                                                                                                                                 |     |                                          |     |     |     |
| <b>Notes:</b>                                                                                                                                                                                           |     |                                          |     |     |     |
| <b>Course assessment</b><br>Total number of assessed students: 9                                                                                                                                        |     |                                          |     |     |     |
| A                                                                                                                                                                                                       | B   | C                                        | D   | E   | FX  |
| 100.0                                                                                                                                                                                                   | 0.0 | 0.0                                      | 0.0 | 0.0 | 0.0 |
| <b>Provides:</b> doc. Mgr. Daniel Jancura, PhD.                                                                                                                                                         |     |                                          |     |     |     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                            |     |                                          |     |     |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                        |     |                                          |     |     |     |

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                         |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                         |
| <b>Course ID:</b> CJP/<br>PFAJKKA/07                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Course name:</b> Communicative Competence in English |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 <b>Per study period:</b> 28<br><b>Course method:</b> combined, present                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                         |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                         |
| <b>Recommended semester/trimester of the course:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                         |
| <b>Course level:</b> I., II., N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                         |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                         |
| <b>Conditions for course completion:</b><br>Active participation in class and completed homework assignments. Students are allowed to miss two classes at the most.<br>Continuous assessment: 2 credit tests (presumably in weeks 6 and 13) and academic presentation in English.<br>Test 1 = 40 points, test 2 = 40 points, presentation = 20 points.<br>In order to pass the course, it is necessary to score at least 65 points as a sum of test and presentation scores.<br>Final grade will be calculated as follows:<br>A 93-100 %, B 86-92%, C 79-85%, D 72-78%, E 65-71%, FX 64 % and less                                                                                                                                                                                                                                                                                                                                                                                     |                                                         |
| <b>Learning outcomes:</b><br>Uplatnenie a aktívne používanie svojich teoretických vedomostí v praktických komunikačných situáciách. Zdokonalenie jazykových vedomostí a zručností študenta, rečovej, pragmatickej a vecnej kompetencie, predovšetkým zlepšujú komunikáciu, schopnosť prijímať a formulovať výpovede, efektívne vyjadrovať svoje myšlienky ako aj orientovať sa v obsahovom pláne výpovede. Precvičovanie rečových intencií kontaktných (napr. pozdravy, oslovenia, pozvanie, oslovenie), informatívnych (napr. získavanie a podávanie informácií, vyjadrenie priestorových a časových vzťahov), regulačných (napr. prosba, poďakovanie, zákaz, pochvala, súhlas, nesúhlas) a hodnotiacich (napr. vyjadrenie vlastného názoru, stanoviska, želania, emócií). Výsledkom budovania praktickej jazykovej kompetencie majú byť vedomosti a zručnosti zodpovedajúce požiadavkám a kritériám dokumentu Spoločný európsky referenčný rámec pre vyučovanie jazykov - úroveň B2. |                                                         |
| <b>Brief outline of the course:</b><br>Rodina, jej formy a problémy<br>Vyjadrovanie pocitov a dojmov<br>Dom, bývanie a budúcnosť<br>Formy a dialekty v anglickom jazyku<br>Život v meste a na vidieku<br>Kolokácie a idiomy, zaužívané slovné spojenia<br>Prázdniny a sviatky vo svete                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                         |

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| Životné prostredie a ekológia<br>Výnimky zo slovosledu<br>Frázové slovesá a ich použitie<br>Charakteristiky neformálneho diškurzu                                                                                                                                                                                                                                                                                                                      |       |       |      |      |      |
| <b>Recommended literature:</b><br>McCarthy M., O'Dell F.: English Vocabulary in Use, 1994<br>Misztal M.: Thematic Vocabulary, 1998<br>Fictumova J., Ceccarelli J., Long T.: Angličtina, konverzace pro pokročilé, Barrister and Principal, 2008<br>Peters S., Gráf T.: Time to practise, Polyglot, 2007<br>www.bbclearningenglish.com<br>Jones L.: Communicative Grammar Practice, CUP, 1985<br>Alexander L.G.: Longman English Grammar, Longman, 1988 |       |       |      |      |      |
| <b>Course language:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                |       |       |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |       |      |      |      |
| <b>Course assessment</b><br>Total number of assessed students: 191                                                                                                                                                                                                                                                                                                                                                                                     |       |       |      |      |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                      | B     | C     | D    | E    | FX   |
| 38.22                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 21.99 | 18.85 | 9.42 | 7.33 | 4.19 |
| <b>Provides:</b> Mgr. Zuzana Naďová                                                                                                                                                                                                                                                                                                                                                                                                                    |       |       |      |      |      |
| <b>Date of last modification:</b> 01.09.2016                                                                                                                                                                                                                                                                                                                                                                                                           |       |       |      |      |      |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                                                                                                                                                                       |       |       |      |      |      |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                   |       |                                                                 |      |       |      |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                      |       |                                                                 |      |       |      |
| <b>Course ID:</b> KGER/<br>NJKK/07                                                                                                                                                                      |       | <b>Course name:</b> Communicative Competence in German Language |      |       |      |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 <b>Per study period:</b> 28<br><b>Course method:</b> present |       |                                                                 |      |       |      |
| <b>Number of credits:</b> 2                                                                                                                                                                             |       |                                                                 |      |       |      |
| <b>Recommended semester/trimester of the course:</b>                                                                                                                                                    |       |                                                                 |      |       |      |
| <b>Course level:</b> I., II.                                                                                                                                                                            |       |                                                                 |      |       |      |
| <b>Prerequisites:</b>                                                                                                                                                                                   |       |                                                                 |      |       |      |
| <b>Conditions for course completion:</b>                                                                                                                                                                |       |                                                                 |      |       |      |
| <b>Learning outcomes:</b>                                                                                                                                                                               |       |                                                                 |      |       |      |
| <b>Brief outline of the course:</b>                                                                                                                                                                     |       |                                                                 |      |       |      |
| <b>Recommended literature:</b>                                                                                                                                                                          |       |                                                                 |      |       |      |
| <b>Course language:</b>                                                                                                                                                                                 |       |                                                                 |      |       |      |
| <b>Notes:</b>                                                                                                                                                                                           |       |                                                                 |      |       |      |
| <b>Course assessment</b><br>Total number of assessed students: 44                                                                                                                                       |       |                                                                 |      |       |      |
| A                                                                                                                                                                                                       | B     | C                                                               | D    | E     | FX   |
| 59.09                                                                                                                                                                                                   | 13.64 | 6.82                                                            | 4.55 | 13.64 | 2.27 |
| <b>Provides:</b> Mgr. Eva Černáková, PhD.                                                                                                                                                               |       |                                                                 |      |       |      |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                            |       |                                                                 |      |       |      |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                        |       |                                                                 |      |       |      |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                      |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                      |
| <b>Course ID:</b> CJP/<br>PFAJGA/07                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Course name:</b> Communicative Grammar in English |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 <b>Per study period:</b> 28<br><b>Course method:</b> combined, present                                                                                                                                                                                                                                                                             |                                                      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                      |
| <b>Recommended semester/trimester of the course:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                      |
| <b>Course level:</b> I., II., N                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                      |
| <b>Conditions for course completion:</b><br>kontrolná písomná práca,<br>záverečná písomná práca<br>stupnica hodnotenia: A 93-100, B 86-92, C 79-85, D 65-71, 64 a menej - FX<br>aktivita na hodinách, povolené 2 absencie<br>predmet je ukončený hodnotením                                                                                                                                                                                                                                   |                                                      |
| <b>Learning outcomes:</b><br>Identifikovanie a odstránenie najfrekvencovanejších gramatických chýb v ústnom prejave, ako aj v písomnom styku. Rozvoj jazykových kompetencií študenta so zameraním na funkcie gramatiky anglického jazyka v každodennej interakcii, v komunikačnom akte na stredne pokročilej úrovni ovládania jazyka (B2 podľa Spoločného európskeho referenčného rámca pre jazyky).                                                                                          |                                                      |
| <b>Brief outline of the course:</b><br>Zvieratá a rastliny na zemi<br>Zločin a trest<br>Cestovanie po mori a vzduchom<br>Jedlá a reštaurácie, národná kuchyňa<br>Vzdelanie na vysokých školách<br>História a viera<br>Vybrané problémy anglickej výslovnosti, gramatiky ( nepriama reč, slovotvorba, predložkové väzby, anglická syntax, kondicionály v angličtine a slovnej zásoby príslušného zamerania<br>Vybrané funkcie praktického odborného jazyka potrebné na prácu s odborným textom |                                                      |
| <b>Recommended literature:</b><br>Misztal M.: Thematic Vocabulary, 1994<br>McCarthy, O'Dell: English Vocabulary in Use, 1994<br>Alexander L.G.: Longman English Grammar, Longman, 1988<br>Jones I. - Communicative Grammar Practice, CUP, 1992<br>Vince M.: Macmillan Grammar in Context, Macmillan, 2008<br>www.bbclearningenglish.com<br>Gráf T., Peters S.: Time to practise, Polyglot, 2007                                                                                               |                                                      |

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| <b>Course language:</b>                          |       |      |      |      |       |
| <b>Notes:</b>                                    |       |      |      |      |       |
| <b>Course assessment</b>                         |       |      |      |      |       |
| Total number of assessed students: 378           |       |      |      |      |       |
| A                                                | B     | C    | D    | E    | FX    |
| 39.42                                            | 18.25 | 17.2 | 8.73 | 5.82 | 10.58 |
| <b>Provides:</b> PaedDr. Gabriela Bednáriková    |       |      |      |      |       |
| <b>Date of last modification:</b> 06.09.2016     |       |      |      |      |       |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc. |       |      |      |      |       |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                   |       |                                                              |      |       |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                      |       |                                                              |      |       |     |
| <b>Course ID:</b> KGER/<br>NJKG/07                                                                                                                                                                      |       | <b>Course name:</b> Communicative Grammar in German Language |      |       |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 <b>Per study period:</b> 28<br><b>Course method:</b> present |       |                                                              |      |       |     |
| <b>Number of credits:</b> 2                                                                                                                                                                             |       |                                                              |      |       |     |
| <b>Recommended semester/trimester of the course:</b>                                                                                                                                                    |       |                                                              |      |       |     |
| <b>Course level:</b> I., II.                                                                                                                                                                            |       |                                                              |      |       |     |
| <b>Prerequisites:</b>                                                                                                                                                                                   |       |                                                              |      |       |     |
| <b>Conditions for course completion:</b>                                                                                                                                                                |       |                                                              |      |       |     |
| <b>Learning outcomes:</b>                                                                                                                                                                               |       |                                                              |      |       |     |
| <b>Brief outline of the course:</b>                                                                                                                                                                     |       |                                                              |      |       |     |
| <b>Recommended literature:</b>                                                                                                                                                                          |       |                                                              |      |       |     |
| <b>Course language:</b>                                                                                                                                                                                 |       |                                                              |      |       |     |
| <b>Notes:</b>                                                                                                                                                                                           |       |                                                              |      |       |     |
| <b>Course assessment</b><br>Total number of assessed students: 46                                                                                                                                       |       |                                                              |      |       |     |
| A                                                                                                                                                                                                       | B     | C                                                            | D    | E     | FX  |
| 54.35                                                                                                                                                                                                   | 13.04 | 8.7                                                          | 4.35 | 10.87 | 8.7 |
| <b>Provides:</b> PaedDr. Ingrid Puchalová, PhD.                                                                                                                                                         |       |                                                              |      |       |     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                            |       |                                                              |      |       |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                        |       |                                                              |      |       |     |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                             |      |                                      |       |       |       |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                |      |                                      |       |       |       |
| <b>Course ID:</b> ÚMV/<br>FKP/10                                                                                                                                                                                                                                                                                                                                                  |      | <b>Course name:</b> Complex analysis |       |       |       |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 3 / 1 <b>Per study period:</b> 42 / 14<br><b>Course method:</b> present                                                                                                                                                        |      |                                      |       |       |       |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                       |      |                                      |       |       |       |
| <b>Recommended semester/trimester of the course:</b> 4., 6.                                                                                                                                                                                                                                                                                                                       |      |                                      |       |       |       |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                           |      |                                      |       |       |       |
| <b>Prerequisites:</b> ÚMV/MAN1c/10 or ÚMV/MAN2d/10 or ÚMV/MAN3c/10                                                                                                                                                                                                                                                                                                                |      |                                      |       |       |       |
| <b>Conditions for course completion:</b><br>Two written test during semester and activity student to practice. Final evaluation is given by continuous assessment, written and oral part of the exam.                                                                                                                                                                             |      |                                      |       |       |       |
| <b>Learning outcomes:</b><br>The purpose of the course is to provide introductory knowledge in differential and integral calculus of complex functions and develop the ability to use this theory.                                                                                                                                                                                |      |                                      |       |       |       |
| <b>Brief outline of the course:</b><br>Complex numbers, complex sequences and series. Function of a complex variable - limits, continuity, differentiability, Cauchy-Riemann equations. Integration in the complex plane - Cauchy's theorems and its consequences. Laurent's series, residues and Cauchy's residue theorem. Laplace and Fourier transform and their applications. |      |                                      |       |       |       |
| <b>Recommended literature:</b><br>1. Priestley, H.A.: Introduction to Complex Analysis. Oxford University Press, Oxford, 2004.<br>2. Sveshnikov, A. - Tikhonov, A.: The Theory of Functions of a Complex Variable. Mir Publishers, Moscow, 1973.                                                                                                                                  |      |                                      |       |       |       |
| <b>Course language:</b><br>Slovak                                                                                                                                                                                                                                                                                                                                                 |      |                                      |       |       |       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                     |      |                                      |       |       |       |
| <b>Course assessment</b><br>Total number of assessed students: 90                                                                                                                                                                                                                                                                                                                 |      |                                      |       |       |       |
| A                                                                                                                                                                                                                                                                                                                                                                                 | B    | C                                    | D     | E     | FX    |
| 8.89                                                                                                                                                                                                                                                                                                                                                                              | 5.56 | 26.67                                | 21.11 | 26.67 | 11.11 |
| <b>Provides:</b> doc. RNDr. Ondrej Hutník, PhD.                                                                                                                                                                                                                                                                                                                                   |      |                                      |       |       |       |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                      |      |                                      |       |       |       |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                                                                                                  |      |                                      |       |       |       |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                             |       |       |      |     |      |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                             |       |       |      |     |      |
| <b>Course ID:</b> ÚFV/POF1a/99                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       | <b>Course name:</b> Computational Physics I |       |       |      |     |      |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                             |       |       |      |     |      |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                             |       |       |      |     |      |
| <b>Recommended semester/trimester of the course:</b> 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                             |       |       |      |     |      |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                             |       |       |      |     |      |
| <b>Prerequisites:</b> ÚFV/ANM/13 or ÚFV/NUM/10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                             |       |       |      |     |      |
| <b>Conditions for course completion:</b><br>Continuous evaluation is based on students' activity in the classroom and work on assignments.<br>Examination and assignments submitted electronically with the attached computer code.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                             |       |       |      |     |      |
| <b>Learning outcomes:</b><br>To teach students to use computer as a tool of modeling of physical reality.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                             |       |       |      |     |      |
| <b>Brief outline of the course:</b><br>Introduction to dynamical systems. Numerical solution of ordinary differential equations (ODE) with initial value. Boundary value problems for ODE. Discrete schemes for partial differential equations (PDE). Numerical solution of PDE. Finite difference methods, consistency, convergence, stability. Elliptic and parabolic PDE. Introduction to Monte Carlo (MC) method and applications in statistical physics. MC simulations of lattice spin systems and stochastic processes.                                                                                                                                                                                                                         |       |                                             |       |       |      |     |      |
| <b>Recommended literature:</b><br>1. C. Pozrikidis: Num. Comp. in Science and Engineering, Oxford Univ. Press, 1998.<br>2. A.L. Garcia: Numerical Methods for Physics, Prentice-Hall, 1994.<br>3. D. P. Landau, K. Binder: A Guide to Monte Carlo Simulations in Statistical Physics, Cambridge Univ. Press, 2000.<br>4. B. A. Berg: Introduction to Markov Chain Monte Carlo Simulations and Their Statistical Analysis, <a href="http://www.worldscibooks.com/etextbook/5904/5904_intro.pdf">http://www.worldscibooks.com/etextbook/5904/5904_intro.pdf</a><br>5. W. Janke: Lectures on Ising model, <a href="http://www.physik.uni-leipzig.de/~janke/Ising_Lectures_Lviv.html">http://www.physik.uni-leipzig.de/~janke/Ising_Lectures_Lviv.html</a> |       |                                             |       |       |      |     |      |
| <b>Course language:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                             |       |       |      |     |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                             |       |       |      |     |      |
| <b>Course assessment</b><br>Total number of assessed students: 85                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                             |       |       |      |     |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | B     | C                                           | D     | E     | FX   | N   | P    |
| 38.82                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 17.65 | 7.06                                        | 15.29 | 12.94 | 2.35 | 0.0 | 5.88 |
| <b>Provides:</b> doc. RNDr. Milan Žukovič, PhD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                             |       |       |      |     |      |

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| <b>Date of last modification:</b> 03.05.2015     |
| <b>Approved:</b> prof. RNDr. Michal Jašcur, CSc. |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                          |     |                                           |     |     |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                             |     |                                           |     |     |     |
| <b>Course ID:</b> ÚFV/ELP1/01                                                                                                                                                                                                                                                                                                                                                                                                  |     | <b>Course name:</b> Electronics Practical |     |     |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 3 <b>Per study period:</b> 42<br><b>Course method:</b> present                                                                                                                                                                                                                        |     |                                           |     |     |     |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                                                    |     |                                           |     |     |     |
| <b>Recommended semester/trimester of the course:</b> 6.                                                                                                                                                                                                                                                                                                                                                                        |     |                                           |     |     |     |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                        |     |                                           |     |     |     |
| <b>Prerequisites:</b> ÚFV/ELE1/07                                                                                                                                                                                                                                                                                                                                                                                              |     |                                           |     |     |     |
| <b>Conditions for course completion:</b><br>Debate with students during practice, trial preparation and processing of theoretical and experimental results of their defense.<br>Summary evaluation of student activities while working on set topics of study practices.                                                                                                                                                       |     |                                           |     |     |     |
| <b>Learning outcomes:</b><br>Practical work of students in the design, construction and properties of the measurements of electronic circuits and interpretation of the results obtained to verify and consolidate the theoretical knowledge acquired in lectures on the subject Electronics.                                                                                                                                  |     |                                           |     |     |     |
| <b>Brief outline of the course:</b><br>1. Combinatorial logical circuits. 2.Logical memory circuits. 3. Logical sequence circuits. 4. Rectifiers, filters, stabilizers. 5. Amplifier with bipolar transistor. 6. Stabilized DC power supplies. 7. Generators of harmonic signals. 8. Operational amplifiers and operational network interfaces. 9. Digital-to-analog converters. 10. Analog-to-digital converters. 11 Reserve. |     |                                           |     |     |     |
| <b>Recommended literature:</b><br>1. Delaney C.F.G.: Electronics for the Physicist with Applications. John Willey & Sons, New York, 1980.<br>2. Zbar P.B., Malvino A.P., Miller M.A.: Basic Electronics: a Text-Lab Manual. Macmillan/McGraw – Hill, New York, 1994.                                                                                                                                                           |     |                                           |     |     |     |
| <b>Course language:</b><br>slovak or english                                                                                                                                                                                                                                                                                                                                                                                   |     |                                           |     |     |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                  |     |                                           |     |     |     |
| <b>Course assessment</b><br>Total number of assessed students: 28                                                                                                                                                                                                                                                                                                                                                              |     |                                           |     |     |     |
| A                                                                                                                                                                                                                                                                                                                                                                                                                              | B   | C                                         | D   | E   | FX  |
| 100.0                                                                                                                                                                                                                                                                                                                                                                                                                          | 0.0 | 0.0                                       | 0.0 | 0.0 | 0.0 |
| <b>Provides:</b> prof. RNDr. Rastislav Varga, DrSc., RNDr. Erik Čižmár, PhD.                                                                                                                                                                                                                                                                                                                                                   |     |                                           |     |     |     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                                                                   |     |                                           |     |     |     |

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

## COURSE INFORMATION LETTER

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------------------------------|------|-----|------|
| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                 |      |     |      |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                 |      |     |      |
| <b>Course ID:</b> ÚFV/<br>ELE1/07                                                                                                                                                                                                                                                                                                                                                                                                                                         |       | <b>Course name:</b> Electronics |      |     |      |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 3 <b>Per study period:</b> 42<br><b>Course method:</b> present                                                                                                                                                                                                                                                                    |       |                                 |      |     |      |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                 |      |     |      |
| <b>Recommended semester/trimester of the course:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                 |      |     |      |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                 |      |     |      |
| <b>Prerequisites:</b> ÚFV/VF1b/03                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                 |      |     |      |
| <b>Conditions for course completion:</b><br>Exam                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                 |      |     |      |
| <b>Learning outcomes:</b><br>To explain physical principles of classical electronic components and systems and technologies of their realization. To perform analysis of properties and functions of basic electronic elements, electronic circuits and information transmission and processing systems. To introduce student into basic elements and devices in area of nanoelectronics and to explain methods of their fabrication and principles of their functioning. |       |                                 |      |     |      |
| <b>Brief outline of the course:</b><br>Structure, properties and physical principles of the activity of selected electronic elements. Analysis of functions and properties of basic analog and digital electronic circuits. Nanoelectronics and selected building components of nanoelectronics: graphene, carbon nanotubes, selected types of nanodevices their properties, fabrication and integration to functional systems.                                           |       |                                 |      |     |      |
| <b>Recommended literature:</b><br>1. Brown P.B., Frantz G.N., Moraff H.: Electronics for the Modern Scientist. Elsevier, 1982.<br>2. Delaney C.F.G.: Electronics for the Physicist with Applications. John Willey & Sons, 1980.<br>3. Wolt E. L.: Quantum Nanoelectronics, An introduction to electronic nanotechnology and quantum computing, Wiley-VCh, 2009                                                                                                            |       |                                 |      |     |      |
| <b>Course language:</b><br>Slovak                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                 |      |     |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                 |      |     |      |
| <b>Course assessment</b><br>Total number of assessed students: 259                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                 |      |     |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | B     | C                               | D    | E   | FX   |
| 30.89                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 27.03 | 27.41                           | 7.72 | 2.7 | 4.25 |
| <b>Provides:</b> Mgr. Vladimír Komanický, PhD.                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                 |      |     |      |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                 |      |     |      |

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

## COURSE INFORMATION LETTER

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                         |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                         |
| <b>Course ID:</b> CJP/<br>PFAJ4/07                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Course name:</b> English Language of Natural Science |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 <b>Per study period:</b> 28<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                         |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                         |
| <b>Recommended semester/trimester of the course:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                         |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                         |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                         |
| <b>Conditions for course completion:</b><br>Active participation in class and completed homework assignments. Students are allowed to miss 2 classes at the most.<br>Continuous assessment: 2 credit tests (presumably in weeks 6 and 13) and academic presentation in English.<br>Test 1 = 40 points, test 2 = 40 points, presentation = 20 points.<br>In order to be admitted to the final exam, a student has to score at least 65 points as a sum of both credit tests and academic presentation.<br>Exam test = 100 points.<br>The exam test results represent 50% of the final grade for the course, continuous assessment results represent the other 50% of the final grade.<br>The final grade for the course will be calculated as follows:<br>A 93-100, B 86-92, C 79-85, D 72-78, E 65-71, FX 64 and less. |                                                         |
| <b>Learning outcomes:</b><br>Rozvoj jazykových kompetencií študentov príslušného študijného odboru, upevňovanie a rozvíjanie všetkých jazykových zručností (hovorenie, písanie, čítanie, počúvanie) predovšetkým v odbornej/profesnej angličtine, na stredne pokročilej úrovni ovládania jazyka (B2).<br>Dôraz sa kladie na aktívne správne používanie odbornej/profesnej angličtiny.                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                         |
| <b>Brief outline of the course:</b><br><b>ANGLICKÝ JAZYK PRE GEOGRAFOV:</b><br>Veda a výskum. Odbor geografia.<br>Planéta Zem. Naša slnečná sústava. Litosféra, hydrosféra, atmosféra, biosféra.<br>Zem - dynamická planéta. Tektonické platne. Sopečná činnosť.<br>Zemetrasenia.<br>Svetové oceány. Morské prúdy. Tsunami.<br>Veľký koralový útes.<br>Atmosféra - zloženie atmosféry.<br>Kontinenty. Európa - krajiny, národnosti.<br><b>ANGLICKÝ JAZYK PRE EKOLÓGOV:</b><br>Veda a výskum. Odbor ekológia.                                                                                                                                                                                                                                                                                                           |                                                         |

Životné prostredie. Znečistenie a dôsledky.  
Sopečná činnosť, zemetrasenia.  
Great Pacific Garbage Patch.  
Globálne otepľovanie a dôsledky. Ľadovce.  
Počasie a klíma. Búrky, hurikány, tsunami.  
Život na Zemi. Ohrozené rastlinné a živočíšne druhy.  
**ANGLICKÝ JAZYK PRE BIOLÓGOV:**  
veda a výskum, odbor biológia  
morfológia rastlín, koreň  
stonka, list  
rozmnožovanie rastlín, kvet  
biológia človeka - telesné sústavy  
slovná zásoba z oblasti botanickej a zoologickej nomenklatúry  
**ANGLICKÝ JAZYK PRE MATEMATIKOV:**  
Veda a výskum, odbor matematika  
čísla a tvary v matematike  
Elementárna algebra  
Elementárna geometria  
Výpočty v matematike  
Pytagoras, Pytagorova veta  
Grafy a diagramy  
Štatistika  
**ANGLICKÝ JAZYK PRE FYZIKOV**  
Veda a výskum, odbor fyzika  
Atómy a molekuly  
Hmota a jej premeny  
Elektrina, jej využitie  
Zvuka, jeho prenos  
Svetlo  
Solárny systém  
Matematické operácie  
**ANGLICKÝ JAZYK PRE CHEMIKOV:**  
Veda a výskum, odbor chémia:  
História, alchímia  
Nomenklatúra  
Laboratórium a jeho vybavenie  
Periodická tabuľka  
Hmota a jej premeny  
Organická chémia  
Anorganická chémia  
**ANGLICKÝ JAZYK PRE INFORMATIKOV:**  
Veda a výskum, informatika  
Život s počítačom  
Typický PC  
Zdravie a bezpečnosť, ergonómika  
Programovanie  
Emailovanie  
Cybercrime  
Trendy budúcnosti

**Recommended literature:**

študijné materiály dodané vyučujúcim

Velebná, V. English for Chemists.

Redman, S.: English Vocabulary in Use, Pre-intermediate, Intermediate. Cambridge University Press. 2003.

Powel, M.: Dynamic Presentations. CUP, 2010

Armer, T.: Cambridge English for Scientists. CUP, 2011

Wharton J.: Academic Encounters. The Natural World, CUP: 2009.

Murphy, R.: English Grammar in Use. Cambridge University Press. 1994.

Redman, s.: English Vocabulary in Use, Pre-intermediate, Intermediate. Cambridge University Press. 2003.

P. Fitzgerald : English for ICT studies, Garnet Publishing, 2011

**Course language:****Notes:****Course assessment**

Total number of assessed students: 2010

| A     | B     | C     | D     | E    | FX   |
|-------|-------|-------|-------|------|------|
| 31.44 | 25.82 | 18.71 | 11.59 | 9.65 | 2.79 |

**Provides:** PaedDr. Gabriela Bednáriková, Mgr. Marianna Škultétyová, Mgr. Zuzana Naďová, PhDr. Helena Petruňová, CSc.

**Date of last modification:** 01.09.2016

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

## COURSE INFORMATION LETTER

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------------------------------------|------|------|-----|
| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                    |      |      |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                                    |      |      |     |
| <b>Course ID:</b> ÚFV/<br>ZPU1/03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       | <b>Course name:</b> Essentials of UNIX Programming |      |      |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 1 / 2 <b>Per study period:</b> 14 / 28<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                                    |      |      |     |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                                    |      |      |     |
| <b>Recommended semester/trimester of the course:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                                    |      |      |     |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                                    |      |      |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                    |      |      |     |
| <b>Conditions for course completion:</b><br>monitoring of student's programming skills<br>to create the program to solve the given task                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                                    |      |      |     |
| <b>Learning outcomes:</b><br>To provide students with basic programming skills necessary for solving problems which require applications of numeric methods, simulation techniques and computer data processing.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                                    |      |      |     |
| <b>Brief outline of the course:</b><br>Essentials of work in Unix type OS. Basic characteristics, filesystems. Terminal. Basic input and output. Redirection of input and output. Command line, command interpreters and formats of basic commands. Process management. Remote terminal.<br>The C programming language: programming environment in UNIX. Compilers. C language syntax. Types of variables. Operators and expressions. Arithmetic operations. Control structures. Functions and program structure. Pointers and arrays. Structures. Standard library. Header files.<br>The C++ programming language. Object oriented programming. Data abstraction. Object. Class. Data encapsulation. Polymorphism. Constructor and destructor.<br>Component programming philosophy. Make, RCS, profilers, debuggers. Utilisation and creation of libraries. External libraries for numerical and distributed computing (LAPACK, MPI). |       |                                                    |      |      |     |
| <b>Recommended literature:</b><br>Stones, R., Matthew, N., Beginning Linux Programming, Computer Press, 2000<br>Kernighan, B. W., Ritchie, D. M., The C Programming Language, Prentice Hall, 1978<br>Stroustrup, B., The C++ Programming Language, Addison-Wesley, 1997                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                                    |      |      |     |
| <b>Course language:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                                    |      |      |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                                    |      |      |     |
| <b>Course assessment</b><br>Total number of assessed students: 108                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                                    |      |      |     |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | B     | C                                                  | D    | E    | FX  |
| 63.89                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 17.59 | 12.96                                              | 4.63 | 0.93 | 0.0 |

|                                                  |
|--------------------------------------------------|
| <b>Provides:</b> RNDr. Branislav Brutovský, CSc. |
| <b>Date of last modification:</b> 03.05.2015     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc. |

## COURSE INFORMATION LETTER

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----------------------------------------------|-----|-----|-----|
| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |                                              |     |     |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                                              |     |     |     |
| <b>Course ID:</b> ÚFV/<br>ZAA/13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      | <b>Course name:</b> Foundations of Astronomy |     |     |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                                 |      |                                              |     |     |     |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |                                              |     |     |     |
| <b>Recommended semester/trimester of the course:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                                              |     |     |     |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                                              |     |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |                                              |     |     |     |
| <b>Conditions for course completion:</b><br>2 written exercises in the scope of examples calculated during the course. More than half the number of points is required for continuous assessment.<br>Oral exam with preparation; 3 questions within the curriculum presented during the course.                                                                                                                                                                                                                                                                            |      |                                              |     |     |     |
| <b>Learning outcomes:</b><br>Become acquainted with knowledge about the basic astronomical concepts, quantities and the methods of their determination.                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                                              |     |     |     |
| <b>Brief outline of the course:</b><br>Coordinate systems in astronomy, the nautical triangle, transformation of coordinates. Measuring time in astronomy, development of the calendar. Diurnal and annual parallaxes, refraction, aberration, precession, nutation, proper motion of stars. Motion in a central field, Kepler's laws, conic sections, velocities, anomalies, Kepler's equation, orbital elements, restricted three body problem. Characteristics of the solar system bodies and methods of their determination. Origin and evolution of the solar system. |      |                                              |     |     |     |
| <b>Recommended literature:</b><br>1. Böhm-Vitense, E., Introduction to stellar astrophysics, Basic stellar observations and data, Cambridge University Press, Cambridge, 1997<br>2. Carrol, B.W., Ostlie, D.A., An introduction to modern astrophysics, Addison-Westley Publ. Comp., Massachusetts, 1996                                                                                                                                                                                                                                                                   |      |                                              |     |     |     |
| <b>Course language:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                                              |     |     |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |                                              |     |     |     |
| <b>Course assessment</b><br>Total number of assessed students: 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                                              |     |     |     |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | B    | C                                            | D   | E   | FX  |
| 60.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 40.0 | 0.0                                          | 0.0 | 0.0 | 0.0 |
| <b>Provides:</b> doc. RNDr. Rudolf Gális, PhD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                                              |     |     |     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |                                              |     |     |     |

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

## COURSE INFORMATION LETTER

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                          |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                          |
| <b>Course ID:</b> ÚFV/<br>VBF1/08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Course name:</b> General Biophysics I |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 3 <b>Per study period:</b> 42<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                          |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                          |
| <b>Recommended semester/trimester of the course:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                          |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                          |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                          |
| <b>Conditions for course completion:</b><br>Exam.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                          |
| <b>Learning outcomes:</b><br>To provide information about the object, significance and role of biophysics in science. The main emphasis will be given on the understanding of the principles determining the structure and function of the most important biological structures (nucleic acids, proteins, biomembranes) as well as on the thermodynamics and kinetics of selected chemical and biophysical processes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                          |
| <b>Brief outline of the course:</b><br>The definition of biophysics and its role in the science. Intra- and inter-molecular interactions in biological systems. Function and structure of the important biomacromolecules (nucleic acids, proteins, biomembranes, sugars). Conformational transitions in biopolymers: helix-coil transition in DNA, denaturation of proteins, phase transitions in biomembranes.<br>Thermodynamics of biological processes. Gibbs energy and chemical equilibrium, chemical potential, binding constants of the ligand-macromolecule interactions, cooperativity of the binding between biological important molecules, membrane potential.<br>Kinetics of the chemical and biophysical processes. The principles of chemical kinetics, enzymatic reactions, inhibition of the enzymes, membrane transport, introduction to the pharmacokinetics.<br>Cell biophysics. The basic bioenergetic processes, oxidative phosphorylation, photosynthesis. Mechanisms of regulations and control processes in cells-the basic principles.<br>Medicinal biophysics. Biophysical principles of selected diagnostic and therapeutical methods.<br>Radiation and environmental biophysics. The influence of physico-chemical factors of the environment on the living systems. |                                          |
| <b>Recommended literature:</b><br>1. M. B. Jackson, Molecular and cellular biophysics, Cambridge University Press, 2006.<br>2. M. Daune, Molecular biophysics - Structures in motion, Oxford University Press, 2004.<br>3. R. Glaser, Biophysics, Springer Verlag, 2001.<br>4. M.V. Volkenštein, Biofizika, Nauka, Moskva 1988.<br>5. W.Hoppe and W. Lohmann, Biophysics, Springer Verlag, 1988.<br>6. D.G. Nichols and S.J. Ferguson, Bioenergetics 3, Academic Press, Elsevier Science Ltd., 2002.<br>7. D. T. Haynie, Biological thermodynamics, Cambridge University Press, 2001.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                          |

|                                                                    |      |      |      |      |     |
|--------------------------------------------------------------------|------|------|------|------|-----|
| <b>Course language:</b><br>Slovak                                  |      |      |      |      |     |
| <b>Notes:</b>                                                      |      |      |      |      |     |
| <b>Course assessment</b><br>Total number of assessed students: 125 |      |      |      |      |     |
| A                                                                  | B    | C    | D    | E    | FX  |
| 20.0                                                               | 28.0 | 24.8 | 16.0 | 11.2 | 0.0 |
| <b>Provides:</b> doc. Mgr. Daniel Jancura, PhD.                    |      |      |      |      |     |
| <b>Date of last modification:</b> 03.05.2015                       |      |      |      |      |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                   |      |      |      |      |     |

## COURSE INFORMATION LETTER

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------------------------------------|-------|------|-----|
| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                  |       |                                     |       |      |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                     |       |                                     |       |      |     |
| <b>Course ID:</b> ÚBEV/<br>VEK2/10                                                                                                                                                                     |       | <b>Course name:</b> General Ecology |       |      |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 <b>Per study period:</b> 28<br><b>Course method:</b> present |       |                                     |       |      |     |
| <b>Number of credits:</b> 3                                                                                                                                                                            |       |                                     |       |      |     |
| <b>Recommended semester/trimester of the course:</b> 3., 5.                                                                                                                                            |       |                                     |       |      |     |
| <b>Course level:</b> I., II.                                                                                                                                                                           |       |                                     |       |      |     |
| <b>Prerequisites:</b>                                                                                                                                                                                  |       |                                     |       |      |     |
| <b>Conditions for course completion:</b>                                                                                                                                                               |       |                                     |       |      |     |
| <b>Learning outcomes:</b>                                                                                                                                                                              |       |                                     |       |      |     |
| <b>Brief outline of the course:</b>                                                                                                                                                                    |       |                                     |       |      |     |
| <b>Recommended literature:</b>                                                                                                                                                                         |       |                                     |       |      |     |
| <b>Course language:</b>                                                                                                                                                                                |       |                                     |       |      |     |
| <b>Notes:</b>                                                                                                                                                                                          |       |                                     |       |      |     |
| <b>Course assessment</b><br>Total number of assessed students: 110                                                                                                                                     |       |                                     |       |      |     |
| A                                                                                                                                                                                                      | B     | C                                   | D     | E    | FX  |
| 10.0                                                                                                                                                                                                   | 24.55 | 33.64                               | 22.73 | 9.09 | 0.0 |
| <b>Provides:</b> prof. RNDr. Igor Hudec, CSc.                                                                                                                                                          |       |                                     |       |      |     |
| <b>Date of last modification:</b>                                                                                                                                                                      |       |                                     |       |      |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                       |       |                                     |       |      |     |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                       |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                       |
| <b>Course ID:</b> ÚFV/<br>VF1a/12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Course name:</b> General Physics I |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 4 / 2 <b>Per study period:</b> 56 / 28<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                                                                        |                                       |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                       |
| <b>Recommended semester/trimester of the course:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                       |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                       |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                       |
| <b>Conditions for course completion:</b><br>Monitoring tests during the calculus lessons<br>1. in the 6th week<br>2. in the 12th week<br>Final assessment is based on the results of :<br>- oral examination<br>assessment of the calculus lessons (written tests, overall performance during the lessons)                                                                                                                                                                                                                                                                                                        |                                       |
| <b>Learning outcomes:</b><br>Basic knowledge about the mechanics, molecular physics and thermodynamics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                       |
| <b>Brief outline of the course:</b><br>Basic knowledge of the calculus, vector algebra. Standards and units. Kinematics. Dynamics. The principle of relativity in the classical mechanics. Gravitation. Mechanics of many-particle systems. The motion of rigid bodies. Deformation, elasticity. Mechanics of fluids and gases. Laws of ideal gases. Kinetic theory. The thermodynamic laws. Statistical character of the second law. Entropy. Molecular phenomena in liquids and solids. Phase transitions.                                                                                                      |                                       |
| <b>Recommended literature:</b><br>Hajko V., Daniel-Szabó J.: Základy fyziky, VEDA, Bratislava 1983.<br>Veis Š., Maďar J., Martišovits V.: Všeobecná fyzika I., Mechanika a molekulová fyzika, ALFA Bratislava, 1987.<br>Fuka J., Šíroká M.: Obecná fyzika I / skriptum /, PF Univ. Palackého, Olomouc 1983.<br>Hlavička A., a kol.: Fyzika pre pedagogické fakulty, SPN, Praha 1971.<br>Hajko V., a kol.: Fyzika v príkladoch, ALFA Bratislava 1983.<br>Ilkovič D.: Fyzika, SVTL Bratislava, 1962.<br>Slaviček V., Wagner J.: Fyzika pro chemiky, SNTL Praha 1971.<br>Krempaský J.: Fyzika, ALFA Bratislava 1982. |                                       |
| <b>Course language:</b><br>Slovak                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                       |

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|--------------------------------------------------|-------|-------|-------|-------|-----|
| <b>Course assessment</b>                         |       |       |       |       |     |
| Total number of assessed students: 240           |       |       |       |       |     |
| A                                                | B     | C     | D     | E     | FX  |
| 24.58                                            | 15.83 | 20.83 | 13.33 | 17.92 | 7.5 |
| <b>Provides:</b> doc. RNDr. Zuzana Ješková, PhD. |       |       |       |       |     |
| <b>Date of last modification:</b> 03.05.2015     |       |       |       |       |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc. |       |       |       |       |     |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                        |       |       |       |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                        |       |       |       |
| <b>Course ID:</b> ÚFV/<br>VF1b/03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       | <b>Course name:</b> General Physics II |       |       |       |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 4 / 2 <b>Per study period:</b> 56 / 28<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                        |       |       |       |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                        |       |       |       |
| <b>Recommended semester/trimester of the course:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                        |       |       |       |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                        |       |       |       |
| <b>Prerequisites:</b> ÚFV/VF1a/12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                        |       |       |       |
| <b>Conditions for course completion:</b><br>Test.<br>Oral examination.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                        |       |       |       |
| <b>Learning outcomes:</b><br>To obtain a general view on basic electric magnetic phenomena and ability to solve basic problems of this subject.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                        |       |       |       |
| <b>Brief outline of the course:</b><br>Electric field in the free space. Work of the forces in the electrostatic field. Electrostatic field and steady current. Current in electrolytes, semiconductors, gasses and vacuum. Thermoelectric effects. Magnetic field in the free space. The interaction of moving charges with the electric current. Quasi steady electric field. Electromagnetic induction. Energy of magnetic field. AC current and circuits with ac current. Multiphase AC current. Rotating magnetic field. Electric effects in the substances. Magnetic properties of the substances. Magnetic polarization. Diamagnetism and paramagnetism, Magnetic ordering. Ferromagnetism. |       |                                        |       |       |       |
| <b>Recommended literature:</b><br>I. S. Grant, W.R. Phillips, Electromagnetism, John Wiley&Sons, Ltd, England, 1990                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                        |       |       |       |
| <b>Course language:</b><br>english                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                        |       |       |       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                        |       |       |       |
| <b>Course assessment</b><br>Total number of assessed students: 285                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                        |       |       |       |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | B     | C                                      | D     | E     | FX    |
| 31.58                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 16.84 | 16.49                                  | 11.58 | 11.93 | 11.58 |
| <b>Provides:</b> prof. RNDr. Peter Kollár, DrSc., doc. RNDr. Adriana Zelenáková, PhD., RNDr. Erik Čižmár, PhD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                        |       |       |       |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                        |       |       |       |

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

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                         |       |     |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                         |       |     |     |
| <b>Course ID:</b> ÚFV/<br>VF1c/12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       | <b>Course name:</b> General Physics III |       |     |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 4 / 2 <b>Per study period:</b> 56 / 28<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                                        |       |                                         |       |     |     |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                         |       |     |     |
| <b>Recommended semester/trimester of the course:</b> 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                         |       |     |     |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                         |       |     |     |
| <b>Prerequisites:</b> ÚFV/VF1b/03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                         |       |     |     |
| <b>Conditions for course completion:</b><br>Exam+ 2 succesfull test from seminars                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                         |       |     |     |
| <b>Learning outcomes:</b><br>The objective is to acquaint the students with the basis of oscilations, waves and optics.                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                         |       |     |     |
| <b>Brief outline of the course:</b><br>Undamped oscilations, Mathematical, Physical and Torsional pendulum, Damped oscilations, Fourier transformation, Forced oscilations. Waves, their generation, waves equation. Interference. Huyghens principle. Reflection, diffraction. Doppler effect. Waves speed in materials. Acoustics. Geometrical optics. Mirrors, lens. Fotometry.<br>Light as electromagnetic wave. Dispersion, absorption, interference, diffraction, polarization. Photon's theory of light. Law of emision and absorption, Planck's law of radiation. Lasers. |       |                                         |       |     |     |
| <b>Recommended literature:</b><br>1. A. Hlavička et al., Fyzika pro pedagogické fakulty, SPN, 1971<br>2. R.P. Feynman et al., Feynmanove prednášky z Fyziky I,II,III, ALFA, 1985<br>3. D. Halliday et al.,Fyzika-Vysokoškolská učebnice obecné fyziky, VUTIUM, 2010<br>4. J. Fuka, B. Havelka, Optika a atómová fyzika, SPN,1961<br>5. A. Štrba, Všeobecná Fyzika 3 – Optika, ALFA, 1979                                                                                                                                                                                          |       |                                         |       |     |     |
| <b>Course language:</b><br>slovak                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                         |       |     |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                         |       |     |     |
| <b>Course assessment</b><br>Total number of assessed students: 102                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                         |       |     |     |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | B     | C                                       | D     | E   | FX  |
| 31.37                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 26.47 | 25.49                                   | 11.76 | 4.9 | 0.0 |
| <b>Provides:</b> prof. RNDr. Rastislav Varga, DrSc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                         |       |     |     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                         |       |     |     |

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

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |
| <b>Course ID:</b> ÚFV/<br>VF1d/12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Course name:</b> General Physics IV |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 4 / 2 <b>Per study period:</b> 56 / 28<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                        |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                        |
| <b>Recommended semester/trimester of the course:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |
| <b>Prerequisites:</b> ÚFV/VF1c/10 or ÚFV/VF1c/12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |
| <b>Conditions for course completion:</b><br>written tests<br>exam                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                        |
| <b>Learning outcomes:</b><br>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.                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |
| <b>Brief outline of the course:</b><br>Wave character of particles. De Broglie waves. Experimental evidence for de Broglie waves. Structure and models of atoms. Atomic spectra. Magnetic properties of atoms. X-ray spectra. Basic characteristics of the atomic nuclei. Nuclear forces and models. Radioactivity. Applications of radioactivity. Nuclear reactions. Elementary particles, basic properties and classification. Types of interactions. Resonances. Cosmic rays. Passage of particles through matter. Detectors. Accelerators.                                                                                                                 |                                        |
| <b>Recommended literature:</b><br>1. Beiser A., Úvod do moderní fyziky, Praha, 1975.<br>2. Vanovič J.: Atómová fyzika, Bratislava, 1980.<br>3. Griffiths D. , Introduction to Elementary Particles, WILEY, 1987.<br>4. Úlehla I., Suk M., Trka Z.: Atómy, jadra, častice, Praha, 1990.<br>5. Síleš E., Martinská G.: Všeobecná fyzika IV, skriptá PF UPJŠ, 2. vydanie, Košice, 1992.<br>5. Hajko V. and team of authors, Physics in experiments, Bratislava, 1997.<br>6. Nosek D., Jádra a částice (Řešené příklady), Matfyzpress, MFF UK, Praha 2005,<br>7. Brandt S., The harvest of a century, Discoveries of modern physics in 100 episodes, Oxford, 2009. |                                        |
| <b>Course language:</b><br>slovak and english                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |

|                                                                                                               |       |       |       |       |     |
|---------------------------------------------------------------------------------------------------------------|-------|-------|-------|-------|-----|
| <b>Course assessment</b>                                                                                      |       |       |       |       |     |
| Total number of assessed students: 57                                                                         |       |       |       |       |     |
| A                                                                                                             | B     | C     | D     | E     | FX  |
| 38.6                                                                                                          | 22.81 | 17.54 | 10.53 | 10.53 | 0.0 |
| <b>Provides:</b> prof. RNDr. Stanislav Vokál, DrSc., RNDr. Janka Vrláková, PhD., RNDr. Adela Kravčáková, PhD. |       |       |       |       |     |
| <b>Date of last modification:</b> 03.05.2015                                                                  |       |       |       |       |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                              |       |       |       |       |     |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                        |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                        |
| <b>Course ID:</b> ÚFV/<br>DEJ1/99                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Course name:</b> History of Physics |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 <b>Per study period:</b> 28<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |
| <b>Recommended semester/trimester of the course:</b> 4., 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |
| <b>Course level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                        |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                        |
| <b>Conditions for course completion:</b><br>written test and thesis<br>exam                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |
| <b>Learning outcomes:</b><br>Basic facts in the history of physics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                        |
| <b>Brief outline of the course:</b><br>Evolution of knowledge before Galileo. Evolution of physics within the mechanical picture of the world. Evolution and limits of classical physics, phase of breakthrough in physics. Origin and evolution of the theory of relativity. Quantum physics and prospects of further evolution of physics and their application. Contemporary state of physical research and its application in technology, natural sciences and philosophy. Position of physics in our society.                                                                                                                                                                                                                                                                                 |                                        |
| <b>Recommended literature:</b><br>1. R.Zajac, J.Chrapan: Dejiny fyziky, skriptá, MFF UK, Bratislava, 1982.<br>2. V.Mališek: Co víte o dějinách fyziky, Horizont, Praha, 1986.<br>3. I.Kraus, Fyzika v kulturních dějinách Evropy, Starověk a středověk, Nakladatelství ČVUT, Praha, 2006.<br>4. A.I.Abramov: Istoria jadernoj fiziky, KomKniga, Moskva, 2006.<br>5. L.I.Ponomarev: Pod znakom kvanta, Fizmatlit, Moskva, 2006.<br>6. I.Kraus, Fyzika v kulturních dějinách Evropy, Od Leonarda ke Goethovi, Nakladatelství ČVUT, Praha, 2007.<br>7. I.Kraus, Fyzika od Thaléta k Newtonovi, Academia, Praha, 2007.<br>8. I.Štoll, Dějiny fyziky, Prometheus, Praha, 2009.<br>9. www-pages.<br>10.Brandt S., The harvest of a century, Discoveries of modern physics in 100 episodes, Oxford, 2009. |                                        |
| <b>Course language:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |

|                                                     |       |       |     |     |     |
|-----------------------------------------------------|-------|-------|-----|-----|-----|
| <b>Course assessment</b>                            |       |       |     |     |     |
| Total number of assessed students: 13               |       |       |     |     |     |
| A                                                   | B     | C     | D   | E   | FX  |
| 69.23                                               | 15.38 | 15.38 | 0.0 | 0.0 | 0.0 |
| <b>Provides:</b> prof. RNDr. Stanislav Vokál, DrSc. |       |       |     |     |     |
| <b>Date of last modification:</b> 27.05.2015        |       |       |     |     |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.    |       |       |     |     |     |

## COURSE INFORMATION LETTER

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-------|
| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                              |                                                          |       |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                 |                                                          |       |
| <b>Course ID:</b> R UPJŠ/<br>IB10/14                                                                                                                                               | <b>Course name:</b> IB10 - Medzinárodný certifikát ECo-C |       |
| <b>Course type, scope and the method:</b><br><b>Course type:</b><br><b>Recommended course-load (hours):</b><br><b>Per week: Per study period:</b><br><b>Course method:</b> present |                                                          |       |
| <b>Number of credits:</b> 16                                                                                                                                                       |                                                          |       |
| <b>Recommended semester/trimester of the course:</b>                                                                                                                               |                                                          |       |
| <b>Course level:</b> I., II.                                                                                                                                                       |                                                          |       |
| <b>Prerequisites:</b>                                                                                                                                                              |                                                          |       |
| <b>Conditions for course completion:</b>                                                                                                                                           |                                                          |       |
| <b>Learning outcomes:</b>                                                                                                                                                          |                                                          |       |
| <b>Brief outline of the course:</b>                                                                                                                                                |                                                          |       |
| <b>Recommended literature:</b>                                                                                                                                                     |                                                          |       |
| <b>Course language:</b>                                                                                                                                                            |                                                          |       |
| <b>Notes:</b>                                                                                                                                                                      |                                                          |       |
| <b>Course assessment</b><br>Total number of assessed students: 0                                                                                                                   |                                                          |       |
| abs                                                                                                                                                                                | n                                                        | neabs |
| 0.0                                                                                                                                                                                | 0.0                                                      | 0.0   |
| <b>Provides:</b>                                                                                                                                                                   |                                                          |       |
| <b>Date of last modification:</b>                                                                                                                                                  |                                                          |       |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                   |                                                          |       |

## COURSE INFORMATION LETTER

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-------|
| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                              |                                                         |       |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                 |                                                         |       |
| <b>Course ID:</b> R UPJŠ/<br>IB11/14                                                                                                                                               | <b>Course name:</b> IB11 - Medzinárodný certifikát ECDL |       |
| <b>Course type, scope and the method:</b><br><b>Course type:</b><br><b>Recommended course-load (hours):</b><br><b>Per week: Per study period:</b><br><b>Course method:</b> present |                                                         |       |
| <b>Number of credits:</b> 14                                                                                                                                                       |                                                         |       |
| <b>Recommended semester/trimester of the course:</b>                                                                                                                               |                                                         |       |
| <b>Course level:</b> I., II.                                                                                                                                                       |                                                         |       |
| <b>Prerequisites:</b>                                                                                                                                                              |                                                         |       |
| <b>Conditions for course completion:</b>                                                                                                                                           |                                                         |       |
| <b>Learning outcomes:</b>                                                                                                                                                          |                                                         |       |
| <b>Brief outline of the course:</b>                                                                                                                                                |                                                         |       |
| <b>Recommended literature:</b>                                                                                                                                                     |                                                         |       |
| <b>Course language:</b>                                                                                                                                                            |                                                         |       |
| <b>Notes:</b>                                                                                                                                                                      |                                                         |       |
| <b>Course assessment</b><br>Total number of assessed students: 0                                                                                                                   |                                                         |       |
| abs                                                                                                                                                                                | n                                                       | neabs |
| 0.0                                                                                                                                                                                | 0.0                                                     | 0.0   |
| <b>Provides:</b>                                                                                                                                                                   |                                                         |       |
| <b>Date of last modification:</b>                                                                                                                                                  |                                                         |       |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                   |                                                         |       |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                              |                                                                            |       |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                 |                                                                            |       |
| <b>Course ID:</b> R UPJŠ/<br>IB12/14                                                                                                                                               | <b>Course name:</b> IB12 - Používanie, administrácia a vývoj v systéme SAP |       |
| <b>Course type, scope and the method:</b><br><b>Course type:</b><br><b>Recommended course-load (hours):</b><br><b>Per week: Per study period:</b><br><b>Course method:</b> present |                                                                            |       |
| <b>Number of credits:</b> 54                                                                                                                                                       |                                                                            |       |
| <b>Recommended semester/trimester of the course:</b>                                                                                                                               |                                                                            |       |
| <b>Course level:</b> I., II.                                                                                                                                                       |                                                                            |       |
| <b>Prerequisites:</b>                                                                                                                                                              |                                                                            |       |
| <b>Conditions for course completion:</b>                                                                                                                                           |                                                                            |       |
| <b>Learning outcomes:</b>                                                                                                                                                          |                                                                            |       |
| <b>Brief outline of the course:</b>                                                                                                                                                |                                                                            |       |
| <b>Recommended literature:</b>                                                                                                                                                     |                                                                            |       |
| <b>Course language:</b>                                                                                                                                                            |                                                                            |       |
| <b>Notes:</b>                                                                                                                                                                      |                                                                            |       |
| <b>Course assessment</b><br>Total number of assessed students: 0                                                                                                                   |                                                                            |       |
| abs                                                                                                                                                                                | n                                                                          | neabs |
| 0.0                                                                                                                                                                                | 0.0                                                                        | 0.0   |
| <b>Provides:</b>                                                                                                                                                                   |                                                                            |       |
| <b>Date of last modification:</b>                                                                                                                                                  |                                                                            |       |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                   |                                                                            |       |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                              |                                                                                |       |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                 |                                                                                |       |
| <b>Course ID:</b> R UPJŠ/IB1/14                                                                                                                                                    | <b>Course name:</b> IB1 - Etika v biomedicínskych vedách pre zdravotnícku prax |       |
| <b>Course type, scope and the method:</b><br><b>Course type:</b><br><b>Recommended course-load (hours):</b><br><b>Per week: Per study period:</b><br><b>Course method:</b> present |                                                                                |       |
| <b>Number of credits:</b> 16                                                                                                                                                       |                                                                                |       |
| <b>Recommended semester/trimester of the course:</b>                                                                                                                               |                                                                                |       |
| <b>Course level:</b> I., II.                                                                                                                                                       |                                                                                |       |
| <b>Prerequisites:</b>                                                                                                                                                              |                                                                                |       |
| <b>Conditions for course completion:</b>                                                                                                                                           |                                                                                |       |
| <b>Learning outcomes:</b>                                                                                                                                                          |                                                                                |       |
| <b>Brief outline of the course:</b>                                                                                                                                                |                                                                                |       |
| <b>Recommended literature:</b>                                                                                                                                                     |                                                                                |       |
| <b>Course language:</b>                                                                                                                                                            |                                                                                |       |
| <b>Notes:</b>                                                                                                                                                                      |                                                                                |       |
| <b>Course assessment</b><br>Total number of assessed students: 0                                                                                                                   |                                                                                |       |
| abs                                                                                                                                                                                | n                                                                              | neabs |
| 0.0                                                                                                                                                                                | 0.0                                                                            | 0.0   |
| <b>Provides:</b>                                                                                                                                                                   |                                                                                |       |
| <b>Date of last modification:</b>                                                                                                                                                  |                                                                                |       |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                   |                                                                                |       |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                              |                                                                   |       |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                 |                                                                   |       |
| <b>Course ID:</b> R UPJŠ/IB2/14                                                                                                                                                    | <b>Course name:</b> IB2 - Právne minimum – súkromnoprávne aspekty |       |
| <b>Course type, scope and the method:</b><br><b>Course type:</b><br><b>Recommended course-load (hours):</b><br><b>Per week: Per study period:</b><br><b>Course method:</b> present |                                                                   |       |
| <b>Number of credits:</b> 16                                                                                                                                                       |                                                                   |       |
| <b>Recommended semester/trimester of the course:</b>                                                                                                                               |                                                                   |       |
| <b>Course level:</b> I., II.                                                                                                                                                       |                                                                   |       |
| <b>Prerequisites:</b>                                                                                                                                                              |                                                                   |       |
| <b>Conditions for course completion:</b>                                                                                                                                           |                                                                   |       |
| <b>Learning outcomes:</b>                                                                                                                                                          |                                                                   |       |
| <b>Brief outline of the course:</b>                                                                                                                                                |                                                                   |       |
| <b>Recommended literature:</b>                                                                                                                                                     |                                                                   |       |
| <b>Course language:</b>                                                                                                                                                            |                                                                   |       |
| <b>Notes:</b>                                                                                                                                                                      |                                                                   |       |
| <b>Course assessment</b><br>Total number of assessed students: 0                                                                                                                   |                                                                   |       |
| abs                                                                                                                                                                                | n                                                                 | neabs |
| 0.0                                                                                                                                                                                | 0.0                                                               | 0.0   |
| <b>Provides:</b>                                                                                                                                                                   |                                                                   |       |
| <b>Date of last modification:</b>                                                                                                                                                  |                                                                   |       |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                   |                                                                   |       |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                              |                                                                  |       |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                 |                                                                  |       |
| <b>Course ID:</b> R UPJŠ/IB3/14                                                                                                                                                    | <b>Course name:</b> IB3 - Právne minimum – verejnoprávne aspekty |       |
| <b>Course type, scope and the method:</b><br><b>Course type:</b><br><b>Recommended course-load (hours):</b><br><b>Per week: Per study period:</b><br><b>Course method:</b> present |                                                                  |       |
| <b>Number of credits:</b> 16                                                                                                                                                       |                                                                  |       |
| <b>Recommended semester/trimester of the course:</b>                                                                                                                               |                                                                  |       |
| <b>Course level:</b> I., II.                                                                                                                                                       |                                                                  |       |
| <b>Prerequisites:</b>                                                                                                                                                              |                                                                  |       |
| <b>Conditions for course completion:</b>                                                                                                                                           |                                                                  |       |
| <b>Learning outcomes:</b>                                                                                                                                                          |                                                                  |       |
| <b>Brief outline of the course:</b>                                                                                                                                                |                                                                  |       |
| <b>Recommended literature:</b>                                                                                                                                                     |                                                                  |       |
| <b>Course language:</b>                                                                                                                                                            |                                                                  |       |
| <b>Notes:</b>                                                                                                                                                                      |                                                                  |       |
| <b>Course assessment</b><br>Total number of assessed students: 0                                                                                                                   |                                                                  |       |
| abs                                                                                                                                                                                | n                                                                | neabs |
| 0.0                                                                                                                                                                                | 0.0                                                              | 0.0   |
| <b>Provides:</b>                                                                                                                                                                   |                                                                  |       |
| <b>Date of last modification:</b>                                                                                                                                                  |                                                                  |       |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                   |                                                                  |       |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                              |                                                |       |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                 |                                                |       |
| <b>Course ID:</b> R UPJŠ/<br>IB4/14                                                                                                                                                | <b>Course name:</b> IB4 - Projektový manažment |       |
| <b>Course type, scope and the method:</b><br><b>Course type:</b><br><b>Recommended course-load (hours):</b><br><b>Per week: Per study period:</b><br><b>Course method:</b> present |                                                |       |
| <b>Number of credits:</b> 20                                                                                                                                                       |                                                |       |
| <b>Recommended semester/trimester of the course:</b>                                                                                                                               |                                                |       |
| <b>Course level:</b> I., II.                                                                                                                                                       |                                                |       |
| <b>Prerequisites:</b>                                                                                                                                                              |                                                |       |
| <b>Conditions for course completion:</b>                                                                                                                                           |                                                |       |
| <b>Learning outcomes:</b>                                                                                                                                                          |                                                |       |
| <b>Brief outline of the course:</b>                                                                                                                                                |                                                |       |
| <b>Recommended literature:</b>                                                                                                                                                     |                                                |       |
| <b>Course language:</b>                                                                                                                                                            |                                                |       |
| <b>Notes:</b>                                                                                                                                                                      |                                                |       |
| <b>Course assessment</b><br>Total number of assessed students: 0                                                                                                                   |                                                |       |
| abs                                                                                                                                                                                | n                                              | neabs |
| 0.0                                                                                                                                                                                | 0.0                                            | 0.0   |
| <b>Provides:</b>                                                                                                                                                                   |                                                |       |
| <b>Date of last modification:</b>                                                                                                                                                  |                                                |       |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                   |                                                |       |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                              |                                                |       |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                 |                                                |       |
| <b>Course ID:</b> R UPJŠ/IB5/14                                                                                                                                                    | <b>Course name:</b> IB5 - Manažérska ekonomika |       |
| <b>Course type, scope and the method:</b><br><b>Course type:</b><br><b>Recommended course-load (hours):</b><br><b>Per week: Per study period:</b><br><b>Course method:</b> present |                                                |       |
| <b>Number of credits:</b> 16                                                                                                                                                       |                                                |       |
| <b>Recommended semester/trimester of the course:</b>                                                                                                                               |                                                |       |
| <b>Course level:</b> I., II.                                                                                                                                                       |                                                |       |
| <b>Prerequisites:</b>                                                                                                                                                              |                                                |       |
| <b>Conditions for course completion:</b>                                                                                                                                           |                                                |       |
| <b>Learning outcomes:</b>                                                                                                                                                          |                                                |       |
| <b>Brief outline of the course:</b>                                                                                                                                                |                                                |       |
| <b>Recommended literature:</b>                                                                                                                                                     |                                                |       |
| <b>Course language:</b>                                                                                                                                                            |                                                |       |
| <b>Notes:</b>                                                                                                                                                                      |                                                |       |
| <b>Course assessment</b><br>Total number of assessed students: 0                                                                                                                   |                                                |       |
| abs                                                                                                                                                                                | n                                              | neabs |
| 0.0                                                                                                                                                                                | 0.0                                            | 0.0   |
| <b>Provides:</b>                                                                                                                                                                   |                                                |       |
| <b>Date of last modification:</b>                                                                                                                                                  |                                                |       |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                   |                                                |       |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                              |                                                                                       |       |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                 |                                                                                       |       |
| <b>Course ID:</b> R UPJŠ/IB6/14                                                                                                                                                    | <b>Course name:</b> IB6 - Riešenie konfliktných a krízových situácií v školskej praxi |       |
| <b>Course type, scope and the method:</b><br><b>Course type:</b><br><b>Recommended course-load (hours):</b><br><b>Per week: Per study period:</b><br><b>Course method:</b> present |                                                                                       |       |
| <b>Number of credits:</b> 16                                                                                                                                                       |                                                                                       |       |
| <b>Recommended semester/trimester of the course:</b>                                                                                                                               |                                                                                       |       |
| <b>Course level:</b> I., II.                                                                                                                                                       |                                                                                       |       |
| <b>Prerequisites:</b>                                                                                                                                                              |                                                                                       |       |
| <b>Conditions for course completion:</b>                                                                                                                                           |                                                                                       |       |
| <b>Learning outcomes:</b>                                                                                                                                                          |                                                                                       |       |
| <b>Brief outline of the course:</b>                                                                                                                                                |                                                                                       |       |
| <b>Recommended literature:</b>                                                                                                                                                     |                                                                                       |       |
| <b>Course language:</b>                                                                                                                                                            |                                                                                       |       |
| <b>Notes:</b>                                                                                                                                                                      |                                                                                       |       |
| <b>Course assessment</b><br>Total number of assessed students: 0                                                                                                                   |                                                                                       |       |
| abs                                                                                                                                                                                | n                                                                                     | neabs |
| 0.0                                                                                                                                                                                | 0.0                                                                                   | 0.0   |
| <b>Provides:</b>                                                                                                                                                                   |                                                                                       |       |
| <b>Date of last modification:</b>                                                                                                                                                  |                                                                                       |       |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                   |                                                                                       |       |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                              |                                                   |       |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                 |                                                   |       |
| <b>Course ID:</b> R UPJŠ/IB7/14                                                                                                                                                    | <b>Course name:</b> IB7 - Statistics for Practice |       |
| <b>Course type, scope and the method:</b><br><b>Course type:</b><br><b>Recommended course-load (hours):</b><br><b>Per week: Per study period:</b><br><b>Course method:</b> present |                                                   |       |
| <b>Number of credits:</b> 16                                                                                                                                                       |                                                   |       |
| <b>Recommended semester/trimester of the course:</b>                                                                                                                               |                                                   |       |
| <b>Course level:</b> I., II.                                                                                                                                                       |                                                   |       |
| <b>Prerequisites:</b>                                                                                                                                                              |                                                   |       |
| <b>Conditions for course completion:</b>                                                                                                                                           |                                                   |       |
| <b>Learning outcomes:</b>                                                                                                                                                          |                                                   |       |
| <b>Brief outline of the course:</b>                                                                                                                                                |                                                   |       |
| <b>Recommended literature:</b>                                                                                                                                                     |                                                   |       |
| <b>Course language:</b>                                                                                                                                                            |                                                   |       |
| <b>Notes:</b>                                                                                                                                                                      |                                                   |       |
| <b>Course assessment</b><br>Total number of assessed students: 0                                                                                                                   |                                                   |       |
| abs                                                                                                                                                                                | n                                                 | neabs |
| 0.0                                                                                                                                                                                | 0.0                                               | 0.0   |
| <b>Provides:</b>                                                                                                                                                                   |                                                   |       |
| <b>Date of last modification:</b>                                                                                                                                                  |                                                   |       |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                   |                                                   |       |

## COURSE INFORMATION LETTER

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------|
| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                              |                                                                               |       |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                 |                                                                               |       |
| <b>Course ID:</b> R UPJŠ/IB8/14                                                                                                                                                    | <b>Course name:</b> IB8 - Environmentálne aspekty záťaže životného prostredia |       |
| <b>Course type, scope and the method:</b><br><b>Course type:</b><br><b>Recommended course-load (hours):</b><br><b>Per week: Per study period:</b><br><b>Course method:</b> present |                                                                               |       |
| <b>Number of credits:</b> 16                                                                                                                                                       |                                                                               |       |
| <b>Recommended semester/trimester of the course:</b>                                                                                                                               |                                                                               |       |
| <b>Course level:</b> I., II.                                                                                                                                                       |                                                                               |       |
| <b>Prerequisites:</b>                                                                                                                                                              |                                                                               |       |
| <b>Conditions for course completion:</b>                                                                                                                                           |                                                                               |       |
| <b>Learning outcomes:</b>                                                                                                                                                          |                                                                               |       |
| <b>Brief outline of the course:</b>                                                                                                                                                |                                                                               |       |
| <b>Recommended literature:</b>                                                                                                                                                     |                                                                               |       |
| <b>Course language:</b>                                                                                                                                                            |                                                                               |       |
| <b>Notes:</b>                                                                                                                                                                      |                                                                               |       |
| <b>Course assessment</b><br>Total number of assessed students: 0                                                                                                                   |                                                                               |       |
| abs                                                                                                                                                                                | n                                                                             | neabs |
| 0.0                                                                                                                                                                                | 0.0                                                                           | 0.0   |
| <b>Provides:</b>                                                                                                                                                                   |                                                                               |       |
| <b>Date of last modification:</b>                                                                                                                                                  |                                                                               |       |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                   |                                                                               |       |

## COURSE INFORMATION LETTER

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-------|
| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                              |                                                         |       |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                 |                                                         |       |
| <b>Course ID:</b> R UPJŠ/IB9/14                                                                                                                                                    | <b>Course name:</b> IB9 - Medzinárodný certifikát TOEFL |       |
| <b>Course type, scope and the method:</b><br><b>Course type:</b><br><b>Recommended course-load (hours):</b><br><b>Per week: Per study period:</b><br><b>Course method:</b> present |                                                         |       |
| <b>Number of credits:</b> 17                                                                                                                                                       |                                                         |       |
| <b>Recommended semester/trimester of the course:</b>                                                                                                                               |                                                         |       |
| <b>Course level:</b> I., II.                                                                                                                                                       |                                                         |       |
| <b>Prerequisites:</b>                                                                                                                                                              |                                                         |       |
| <b>Conditions for course completion:</b>                                                                                                                                           |                                                         |       |
| <b>Learning outcomes:</b>                                                                                                                                                          |                                                         |       |
| <b>Brief outline of the course:</b>                                                                                                                                                |                                                         |       |
| <b>Recommended literature:</b>                                                                                                                                                     |                                                         |       |
| <b>Course language:</b>                                                                                                                                                            |                                                         |       |
| <b>Notes:</b>                                                                                                                                                                      |                                                         |       |
| <b>Course assessment</b><br>Total number of assessed students: 0                                                                                                                   |                                                         |       |
| abs                                                                                                                                                                                | n                                                       | neabs |
| 0.0                                                                                                                                                                                | 0.0                                                     | 0.0   |
| <b>Provides:</b>                                                                                                                                                                   |                                                         |       |
| <b>Date of last modification:</b>                                                                                                                                                  |                                                         |       |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                   |                                                         |       |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                             |     |                                               |     |     |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                                               |     |     |     |
| <b>Course ID:</b> ÚFV/<br>UAS/13                                                                                                                                                                                                                                                                                                                                                                                                                                  |     | <b>Course name:</b> Introduction to Astronomy |     |     |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 <b>Per study period:</b> 28<br><b>Course method:</b> present                                                                                                                                                                                                                                                            |     |                                               |     |     |     |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |                                               |     |     |     |
| <b>Recommended semester/trimester of the course:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                                           |     |                                               |     |     |     |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |                                               |     |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                             |     |                                               |     |     |     |
| <b>Conditions for course completion:</b><br>2 tests during term. Each test for 15 points. Minimal amounts of points for an exam is 20.<br>Oral examination and test.                                                                                                                                                                                                                                                                                              |     |                                               |     |     |     |
| <b>Learning outcomes:</b><br>Acquaint students with basic astronomy and astrophysic concepts, celestial coordinates, Solar system, formation and evolution of stars and galaxies                                                                                                                                                                                                                                                                                  |     |                                               |     |     |     |
| <b>Brief outline of the course:</b><br>Subject of astronomy, celestial coordinates and their transformations, time and calendar, problem of 2 bodies, Astronomical telescopes, Solar system, radiation of stars and spectrum, properties of stars and their evolution, galaxies.                                                                                                                                                                                  |     |                                               |     |     |     |
| <b>Recommended literature:</b><br>1. Čeman, R., Pittich, E., 2002, Vesmír 1 - Slnečná sústava, MAPA Slovakia<br>2. Čeman, R., Pittich, E., 2003, Vesmír 2 - Hviezdy - Galaxie, MAPA Slovakia<br>3. Grygar, J., Horský, Z., Mayer, P., 1979, Vesmír, Mladá fronta<br>4. Kleczek, J., 2002, Velká encyklopedie vesmíru, Academia<br>5. Pittich, E., Kalmančok, D., 1981, Obloha na dlani, Obzor<br>6. Vanýsek, V.: 1980, Základy astronomie a astrofyziky, Academia |     |                                               |     |     |     |
| <b>Course language:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |                                               |     |     |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                     |     |                                               |     |     |     |
| <b>Course assessment</b><br>Total number of assessed students: 13                                                                                                                                                                                                                                                                                                                                                                                                 |     |                                               |     |     |     |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | B   | C                                             | D   | E   | FX  |
| 100.0                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.0 | 0.0                                           | 0.0 | 0.0 | 0.0 |
| <b>Provides:</b> doc. Mgr. Štefan Parimucha, PhD.                                                                                                                                                                                                                                                                                                                                                                                                                 |     |                                               |     |     |     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                                                                                                      |     |                                               |     |     |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                                                                                                                                                                                  |     |                                               |     |     |     |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                |      |                                                  |     |     |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                   |      |                                                  |     |     |     |
| <b>Course ID:</b> ÚFV/<br>ZAAF/12                                                                                                                                                                                                                                                                                                                    |      | <b>Course name:</b> Introduction to Astrophysics |     |     |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 3 / 1 <b>Per study period:</b> 42 / 14<br><b>Course method:</b> present                                                                                                                           |      |                                                  |     |     |     |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                          |      |                                                  |     |     |     |
| <b>Recommended semester/trimester of the course:</b> 6.                                                                                                                                                                                                                                                                                              |      |                                                  |     |     |     |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                              |      |                                                  |     |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                |      |                                                  |     |     |     |
| <b>Conditions for course completion:</b><br>2 written exercises in the range of examples calculated during the course. More than half the number of points is required for continuous assessment.<br>Oral exam with preparation; 3 questions within the curriculum presented during the course.                                                      |      |                                                  |     |     |     |
| <b>Learning outcomes:</b><br>Become acquainted with knowledge about the basic astrophysical concepts, quantities and the methods of their determination.                                                                                                                                                                                             |      |                                                  |     |     |     |
| <b>Brief outline of the course:</b><br>Fundamental astrophysical quantities and their determination; magnitudes; Pogson's law; spectral types and luminosity classes; temperatures, masses and radii of stars; rotation and magnetic field of stars; specific intensity, flux; black body radiation; synchrotron radiation; interstellar extinction. |      |                                                  |     |     |     |
| <b>Recommended literature:</b><br>1. Böhm-Vitense, E., Introduction to stellar astrophysics, Basic stellar observations and data, Cambridge University Press, Cambridge, 1997<br>2. Carrol, B.W., Ostlie, D.A., An introduction to modern astrophysics, Addison-Westley Publ. Comp., Massachusetts, 1996                                             |      |                                                  |     |     |     |
| <b>Course language:</b>                                                                                                                                                                                                                                                                                                                              |      |                                                  |     |     |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                        |      |                                                  |     |     |     |
| <b>Course assessment</b><br>Total number of assessed students: 8                                                                                                                                                                                                                                                                                     |      |                                                  |     |     |     |
| A                                                                                                                                                                                                                                                                                                                                                    | B    | C                                                | D   | E   | FX  |
| 75.0                                                                                                                                                                                                                                                                                                                                                 | 25.0 | 0.0                                              | 0.0 | 0.0 | 0.0 |
| <b>Provides:</b> doc. RNDr. Rudolf Gális, PhD.                                                                                                                                                                                                                                                                                                       |      |                                                  |     |     |     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                         |      |                                                  |     |     |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                                                                     |      |                                                  |     |     |     |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                      |       |                                                           |     |     |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                                           |     |     |     |
| <b>Course ID:</b> ÚFV/<br>UPF1/12                                                                                                                                                                                                                                                                                                                                                                                                          |       | <b>Course name:</b> Introduction to Computational Physics |     |     |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14<br><b>Course method:</b> present                                                                                                                                                                                                                 |       |                                                           |     |     |     |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                                           |     |     |     |
| <b>Recommended semester/trimester of the course:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                    |       |                                                           |     |     |     |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                                           |     |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                                           |     |     |     |
| <b>Conditions for course completion:</b><br>Elaboration of microreferat on given topics.<br>Exam and discussion of the implementation of the given project.                                                                                                                                                                                                                                                                                |       |                                                           |     |     |     |
| <b>Learning outcomes:</b><br>The aim of the lecture is to provide students with the physical background of the computational processes in conventional computers, as well as to provide less conventional possibilities to implement computational processes using deeper knowledge of physical processes.                                                                                                                                 |       |                                                           |     |     |     |
| <b>Brief outline of the course:</b><br>Physical processes utilised in contemporary computers. Computational processes / thermodynamics point of view. Physical limits of current computer technologies (Moore, Amdahl laws . Computer modeling and physical reality. Computational complexity and paralelism. Distributed computing. Alternative methods of computation (analogue , optical processors, DNA computing, quantum computing). |       |                                                           |     |     |     |
| <b>Recommended literature:</b><br>Actual literature provided by lecturer.                                                                                                                                                                                                                                                                                                                                                                  |       |                                                           |     |     |     |
| <b>Course language:</b>                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                                           |     |     |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                                           |     |     |     |
| <b>Course assessment</b><br>Total number of assessed students: 21                                                                                                                                                                                                                                                                                                                                                                          |       |                                                           |     |     |     |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                          | B     | C                                                         | D   | E   | FX  |
| 85.71                                                                                                                                                                                                                                                                                                                                                                                                                                      | 14.29 | 0.0                                                       | 0.0 | 0.0 | 0.0 |
| <b>Provides:</b> doc. RNDr. Jozef Uličný, CSc.                                                                                                                                                                                                                                                                                                                                                                                             |       |                                                           |     |     |     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                           |     |     |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                                                                                                                                                           |       |                                                           |     |     |     |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                     |
| <b>Course ID:</b> ÚFV/<br>UVF/05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Course name:</b> Introduction to General Physics |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 <b>Per study period:</b> 28<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                      |                                                     |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                     |
| <b>Recommended semester/trimester of the course:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                     |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                     |
| <b>Conditions for course completion:</b><br>Active presentation during the lessons twice a year<br>Solved assignments<br>Positive results at two written tests                                                                                                                                                                                                                                                                                                                                                                               |                                                     |
| <b>Learning outcomes:</b><br>Conceptual understanding of the key concepts of the topics of Mechanics and Molecular Physics gained with the help of problem solving, physical experiments and multimedial support that is inevitable precondition for the further study at University level. At the end of this course the student will be able to follow with the courses proceeding from the course General Physics I.                                                                                                                      |                                                     |
| <b>Brief outline of the course:</b><br>The subject is a supportive subject to the course General physics 1 - Mechanics and Molecular Physics. The content involves key concepts in mechanics and molecular physics with the help of school experiments, interactive multimedial teaching materials and physical tasks and problems. The aim is to help students to overcome difficulties connected with knowledge gained during the previous study towards the conceptual understanding of the University course content.                    |                                                     |
| <b>Recommended literature:</b><br>1. Sutton, R.M., Demonstration Experiments in Physics, AAPT, 2003<br>2. Pizzo, J.: Interactive Physics demonstration, AAPT, 2001<br>3. Cunningham, J, Herr, N.: Hands on Physics Activities, Jossey-Bass A Wiley Imprint, 1994<br>4. Halliday D., Resnick R., Walker J.: Fyzika. Část 1- 5., Vysokoškolská učebnica fyziky, VUTIUM, Brno, 2000<br>5. Walker, J.: The Flying Circus of Physics with answers, John Wiley&Sons, 2005<br>6. Hajko, V., Daniel-Szabó, J. a kol. Fyzika v príkladoch, Alfa, 1983 |                                                     |
| <b>Course language:</b><br>Slovak                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                     |

|                                                                                 |      |      |      |     |     |
|---------------------------------------------------------------------------------|------|------|------|-----|-----|
| <b>Course assessment</b>                                                        |      |      |      |     |     |
| Total number of assessed students: 200                                          |      |      |      |     |     |
| A                                                                               | B    | C    | D    | E   | FX  |
| 37.5                                                                            | 16.5 | 23.5 | 15.0 | 7.0 | 0.5 |
| <b>Provides:</b> doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Marián Kireš, PhD. |      |      |      |     |     |
| <b>Date of last modification:</b> 03.05.2015                                    |      |      |      |     |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                |      |      |      |     |     |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                        |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                        |
| <b>Course ID:</b> ÚFV/<br>UVF2/07                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Course name:</b> Introduction to General Physics II |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 <b>Per study period:</b> 28<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                       |                                                        |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                        |
| <b>Recommended semester/trimester of the course:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                        |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                        |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                        |
| <b>Conditions for course completion:</b><br>Active presentations during the lessons twice a year<br>Solved assignments<br>Positive results at two written tests.                                                                                                                                                                                                                                                                                                                                              |                                                        |
| <b>Learning outcomes:</b><br>Conceptual understanding of the key concepts of the topics of Electricity and Magnetism with the help of problem solving, physical experiments and multimedial support that is inevitable precondition for the further study at University level. At the end of the course the student will be able to follow with the courses, proceeding from the course General physics II.                                                                                                   |                                                        |
| <b>Brief outline of the course:</b><br>The subject is a supportive subject to the course General Physics 2 - Electricity and Magnetism. The content involves key concepts of electricity and magnetism with the help of school experiments, interactive multimedial teaching materials and physical tasks and problems. The aim is to help students to overcome difficulties connected with knowledge gained during the previous study towards the conceptual understanding of the University course content. |                                                        |
| <b>Recommended literature:</b><br>1. Sutton, R.M., Demonstration Experiments in Physics, AAPT, 2003<br>2. Pizzo, J.: Interactive Physics demonstration, AAPT, 2001<br>3. Cunningham, J, Herr, N.: Hands on Physics Activities, Jossey-Bass A Wiley Imprint, 1994<br>4. Halliday D., Resnick R., Walker J.: Fyzika. Část 1- 5., Vysokoškolská učebnica fyziky, VUTIUM, Brno, 2000<br>5. Walker, J.: The Flying Circus of Physics with answers, John Wiley&Sons, 2005                                           |                                                        |
| <b>Course language:</b><br>Slovak                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                        |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                        |

|                                                  |       |       |      |       |     |
|--------------------------------------------------|-------|-------|------|-------|-----|
| <b>Course assessment</b>                         |       |       |      |       |     |
| Total number of assessed students: 167           |       |       |      |       |     |
| A                                                | B     | C     | D    | E     | FX  |
| 41.32                                            | 17.96 | 22.16 | 8.38 | 10.18 | 0.0 |
| <b>Provides:</b> doc. RNDr. Zuzana Ješková, PhD. |       |       |      |       |     |
| <b>Date of last modification:</b> 03.05.2015     |       |       |      |       |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc. |       |       |      |       |     |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                                              |       |      |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                              |       |      |     |
| <b>Course ID:</b> ÚCHV/<br>ZCF/03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       | <b>Course name:</b> Introduction to Chemistry for Physicists |       |      |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                                              |       |      |     |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                                              |       |      |     |
| <b>Recommended semester/trimester of the course:</b> 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                                              |       |      |     |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                                              |       |      |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                                              |       |      |     |
| <b>Conditions for course completion:</b><br>Test (in 4th week, 8th week and in 12th week )<br>Test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                              |       |      |     |
| <b>Learning outcomes:</b><br>The main goal of this subject is to provide an overview of chemical elements, their properties, reactivity, relation between the structure and properties, different types of compounds, new materials and their application.                                                                                                                                                                                                                                                                                                                                                                                       |       |                                                              |       |      |     |
| <b>Brief outline of the course:</b><br>Introduction to general and inorganic chemistry. The periodic table of elements. Atomic structure, electron configuration. Chemical bonding. Chemical reactions. Relation between structure and properties - electrical, magnetic, electrochromic, photochromic, optical, colour of compounds. Photovoltaic systems. Gaseous state, liquids, solids. Non-metallic elements and their compounds. Non-transition metallic elements and their compounds. Transition metal chemistry. Coordination compounds, inclusion compounds, intercalates, composites, new materials, their properties and application. |       |                                                              |       |      |     |
| <b>Recommended literature:</b><br>R.Chang: Chemistry, McGRAW-HILL, Inc., New York 1991                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                                              |       |      |     |
| <b>Course language:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                                              |       |      |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                                              |       |      |     |
| <b>Course assessment</b><br>Total number of assessed students: 72                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                                              |       |      |     |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | B     | C                                                            | D     | E    | FX  |
| 27.78                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 29.17 | 26.39                                                        | 11.11 | 5.56 | 0.0 |
| <b>Provides:</b> RNDr. Martin Vavra, PhD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                                              |       |      |     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                                              |       |      |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                                              |       |      |     |

## COURSE INFORMATION LETTER

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                 |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                 |
| <b>Course ID:</b> ÚMV/<br>UDM/10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Course name:</b> Introduction to mathematics |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 1 / 2 <b>Per study period:</b> 14 / 28<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                 |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                 |
| <b>Recommended semester/trimester of the course:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                 |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                 |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                 |
| <b>Conditions for course completion:</b><br>Two tests during the semester.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                 |
| <b>Learning outcomes:</b><br>Repetition of problematic sections of the secondary mathematics by interesting tasks.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                 |
| <b>Brief outline of the course:</b><br>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. Exponential and logarithmic function; equations and inequalities. Goniometric functions; equations and inequalities. Complex numbers.                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                 |
| <b>Recommended literature:</b><br>1. V. Medek - L. Mišík - T. Šalát: REPETITÓRIUM STREDOŠKOLSKEJ MATEMATIKY, Alfa Bratislava, 1976<br>2. S. Richtárová - D. Kyselová: MATEMATIKA (pomôcka pre maturantov a uchádzačov o štúdium na vysokých školách), Enigma Nitra, 1998<br>3. O. Hudec – Z. Kimáková – E. Švidroňová: PRÍKLADY Z MATEMATIKY (pre uchádzačov o štúdium na TU v Košiciach), EF TU Košice, 1999<br>4. F. Peller – V. Šáner – J. Eliáš – Ľ. Pinda: MATEMATIKA – Podklady na prijímacie testy pre uchádzačov o štúdium, Ekonóm Bratislava, 2000/2001<br>5. F. Vesajda – F. Talafous: ZBIERKA ÚLOH Z MATEMATIKY pre stredné všeobecnovzdelávacie školy a gymnáziá, SPN Bratislava, 1973<br>6. J. Lukášová – O. Odvárko – B. Riečan – J. Šedivý – J. Vyšín: ÚLOHY Z MATEMATIKY pre 4. ročník gymnázia, SPN Bratislava, 1976 |                                                 |
| <b>Course language:</b><br>Slovak                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                 |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                 |

|                                                                                                                             |       |       |       |      |       |
|-----------------------------------------------------------------------------------------------------------------------------|-------|-------|-------|------|-------|
| <b>Course assessment</b>                                                                                                    |       |       |       |      |       |
| Total number of assessed students: 373                                                                                      |       |       |       |      |       |
| A                                                                                                                           | B     | C     | D     | E    | FX    |
| 22.79                                                                                                                       | 12.06 | 16.89 | 15.82 | 19.3 | 13.14 |
| <b>Provides:</b> doc. RNDr. Matúš Harminec, CSc., Mgr. Lucia Janičková, Mgr. Tadeáš Gavala, RNDr. Veronika Hubeňáková, PhD. |       |       |       |      |       |
| <b>Date of last modification:</b> 03.05.2015                                                                                |       |       |       |      |       |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                            |       |       |       |      |       |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                |
| <b>Course ID:</b> ÚFV/<br>ZMF/07                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Course name:</b> Introduction to Mathematics for Physicists |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 <b>Per study period:</b> 28<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                |
| <b>Recommended semester/trimester of the course:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                |
| <b>Conditions for course completion:</b><br>two control tests during semester, solving of three sets of problems, active participation.<br>Summary evaluation of active participation during semester, completed sets of problems and two tests                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                |
| <b>Learning outcomes:</b><br>The aim is the understanding and mastery of basic mathematical concepts and skills of the vector, differential and integral calculus and ordinary differential equations required for introductory physics course.                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                |
| <b>Brief outline of the course:</b><br>The course introduces basic mathematical background to general physics courses: Mechanics & Molecular Physics and Electricity & magnetism.<br>The content deals with understanding the basic concepts of vector algebra and analysis, differential and integral calculus and differential equations.<br>After the course student should be familiar with the concepts: vector, scalar, vector and scalar fields, the function of one variable, derivative, integral, differential equation; to be able to interpret these concepts in real phenomena and acquire basic mathematical skills related to these concepts in problems. |                                                                |
| <b>Recommended literature:</b><br>1. Hughes-Hallet, D. et al, Applied Calculus, 4th ed., John Wiley & Sons, 2010<br>2. Stewart, J., Calculus: early transcendentals, 6th ed., Brooks Cole, 2008<br>3. Zel'dovič, J.B., Jaglom, I.M.: Higher Math for Beginners (Mostly Physicists and Engineers), Mir, Moskva, 1988                                                                                                                                                                                                                                                                                                                                                      |                                                                |
| <b>Course language:</b><br>Slovak                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                |

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|--------------------------------------------------|-------|-------|-------|------|-----|
| <b>Course assessment</b>                         |       |       |       |      |     |
| Total number of assessed students: 174           |       |       |       |      |     |
| A                                                | B     | C     | D     | E    | FX  |
| 39.66                                            | 18.97 | 20.69 | 10.92 | 9.77 | 0.0 |
| <b>Provides:</b> doc. RNDr. Jozef Hanč, PhD.     |       |       |       |      |     |
| <b>Date of last modification:</b> 03.05.2015     |       |       |       |      |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc. |       |       |       |      |     |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                        |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                        |
| <b>Course ID:</b> ÚFV/<br>UFMI/07                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Course name:</b> Introduction to Microworld Physics |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                                    |                                                        |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                        |
| <b>Recommended semester/trimester of the course:</b> 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                        |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                        |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                        |
| <b>Conditions for course completion:</b><br>individual work<br>examination                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                        |
| <b>Learning outcomes:</b><br>Students will acquire qualitative survey of particle physics from beginning till present time.                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                        |
| <b>Brief outline of the course:</b><br>Introduction to problematics ( atom, nucleus ). The first sight at the four types of interactions in nature. The most contemporary notions about the structure of matter and forces of interactions ( nuclear particles , quarks and the eightfold way, quantum chromodynamics- quarks theory, model of electroweak interaction, charm and new discoveries, the grand unification. Cosmology, particle physics and the Big Bang. The experimental methods in particle physics.                                                         |                                                        |
| <b>Recommended literature:</b><br>1. M.Veltman: Facts and Mysteries in Elementary Particle Physics, World Scientific Publishing, 2003.<br>2. F. Close: Particle Physics, A Very Short Introduction, Oxford, 2004.<br>3. F. Close: The cosmic onion, Quarks and the Nature of the Universe, Heinemann Educational Books, 1990.<br>4. R. Mackintosh, J. Al-Khalili, B. Jonson, T. Pena: Jádro, Cesta do srdce hmoty, Academia Praha, 2003.<br>5. J. Žáček: Úvod do fyziky elementárních částic, Karolinum Praha, 2005.<br>6. S. Brandt: The Harvest of a Century, Oxford, 2009. |                                                        |
| <b>Course language:</b><br>slovak and english                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                        |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                        |

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|---------------------------------------------------------------------------|-------|------|-----|-----|-----|
| <b>Course assessment</b>                                                  |       |      |     |     |     |
| Total number of assessed students: 14                                     |       |      |     |     |     |
| A                                                                         | B     | C    | D   | E   | FX  |
| 71.43                                                                     | 21.43 | 7.14 | 0.0 | 0.0 | 0.0 |
| <b>Provides:</b> RNDr. Janka Vrláková, PhD., RNDr. Adela Kravčáková, PhD. |       |      |     |     |     |
| <b>Date of last modification:</b> 03.05.2015                              |       |      |     |     |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                          |       |      |     |     |     |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                                                    |     |     |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                                                    |     |     |     |
| <b>Course ID:</b> ÚFV/<br>UFP/07                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      | <b>Course name:</b> Introduction to Plasma Physics |     |     |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 <b>Per study period:</b> 28<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                |      |                                                    |     |     |     |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                                                    |     |     |     |
| <b>Recommended semester/trimester of the course:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                                                               |      |                                                    |     |     |     |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |                                                    |     |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                                                    |     |     |     |
| <b>Conditions for course completion:</b><br>Recherche work of current status in selected part of the issue.<br>Final examination.                                                                                                                                                                                                                                                                                                                                                     |      |                                                    |     |     |     |
| <b>Learning outcomes:</b><br>To acquaint with the basic physical processes in plasma.                                                                                                                                                                                                                                                                                                                                                                                                 |      |                                                    |     |     |     |
| <b>Brief outline of the course:</b><br>Occurrence of plasma in nature. Definition of plasma state. Temperature, Debye screening, plasma parameter.<br>Motion of single particles. Plasma as mixture of fluids. Waves in plasma. Diffusion and resistivity in weakly ionized and in totally ionized plasma. Hydromagnetic equilibrium and stability. Introduction to kinetic theory. Nonlinear effects. Introduction to controlled thermonuclear reaction. Plasma formations in space. |      |                                                    |     |     |     |
| <b>Recommended literature:</b><br>Chen, F.F., Introduction to Plasma Physics & Controlled Fusion: Volume 1 - Plasma Physics, January 1984 , Plenum Pub. Corp.                                                                                                                                                                                                                                                                                                                         |      |                                                    |     |     |     |
| <b>Course language:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |                                                    |     |     |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                                                    |     |     |     |
| <b>Course assessment</b><br>Total number of assessed students: 42                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                                                    |     |     |     |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | B    | C                                                  | D   | E   | FX  |
| 90.48                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 9.52 | 0.0                                                | 0.0 | 0.0 | 0.0 |
| <b>Provides:</b> prof. Ing. Karel Kudela, DrSc.                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                                                    |     |     |     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                                                    |     |     |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |                                                    |     |     |     |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                |      |                                                                |     |      |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                   |      |                                                                |     |      |     |
| <b>Course ID:</b> ÚFV/<br>ZPRF/11                                                                                                                                                                                                                                    |      | <b>Course name:</b> Introduction to Programming for Physicists |     |      |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 1 / 2 <b>Per study period:</b> 14 / 28<br><b>Course method:</b> present                                           |      |                                                                |     |      |     |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                          |      |                                                                |     |      |     |
| <b>Recommended semester/trimester of the course:</b> 2.                                                                                                                                                                                                              |      |                                                                |     |      |     |
| <b>Course level:</b> I.                                                                                                                                                                                                                                              |      |                                                                |     |      |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                |      |                                                                |     |      |     |
| <b>Conditions for course completion:</b><br>Work on several practical programming tasks<br>50% continuous assessment + 50% final programming project.                                                                                                                |      |                                                                |     |      |     |
| <b>Learning outcomes:</b><br>The aim of the lecture is to obtain the basic knowledge of numerical and graphical evaluation a presentation of scientific data and basic programming skills using a software packages used by experimental and theoretical physicists. |      |                                                                |     |      |     |
| <b>Brief outline of the course:</b><br>Basics of numerical methods for data evaluation and computer physics. Basics of work with Origin and Matlab/Octave software package. Solution of simple physical problems using Matlab/Octave.                                |      |                                                                |     |      |     |
| <b>Recommended literature:</b><br>User documentaton of OriginLab Origin; User documenation of Mathworks Matlab;                                                                                                                                                      |      |                                                                |     |      |     |
| <b>Course language:</b>                                                                                                                                                                                                                                              |      |                                                                |     |      |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                        |      |                                                                |     |      |     |
| <b>Course assessment</b><br>Total number of assessed students: 41                                                                                                                                                                                                    |      |                                                                |     |      |     |
| A                                                                                                                                                                                                                                                                    | B    | C                                                              | D   | E    | FX  |
| 87.8                                                                                                                                                                                                                                                                 | 7.32 | 0.0                                                            | 0.0 | 4.88 | 0.0 |
| <b>Provides:</b> RNDr. Erik Čížmár, PhD.                                                                                                                                                                                                                             |      |                                                                |     |      |     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                         |      |                                                                |     |      |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                     |      |                                                                |     |      |     |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                        |                                                       |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                           |                                                       |
| <b>Course ID:</b> Dek. PF<br>UPJŠ/USPV/13                                                                                                                                                                                                                                                                                                                    | <b>Course name:</b> Introduction to Study of Sciences |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week: Per study period:</b> 12s / 3d<br><b>Course method:</b> present                                                                                                                                               |                                                       |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                  |                                                       |
| <b>Recommended semester/trimester of the course:</b> 1.                                                                                                                                                                                                                                                                                                      |                                                       |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                      |                                                       |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                        |                                                       |
| <b>Conditions for course completion:</b>                                                                                                                                                                                                                                                                                                                     |                                                       |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                                                                                    |                                                       |
| <b>Brief outline of the course:</b>                                                                                                                                                                                                                                                                                                                          |                                                       |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                                                                               |                                                       |
| <b>Course language:</b>                                                                                                                                                                                                                                                                                                                                      |                                                       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                |                                                       |
| <b>Course assessment</b><br>Total number of assessed students: 733                                                                                                                                                                                                                                                                                           |                                                       |
| abs                                                                                                                                                                                                                                                                                                                                                          | n                                                     |
| 96.32                                                                                                                                                                                                                                                                                                                                                        | 3.68                                                  |
| <b>Provides:</b> doc. RNDr. Mária Kožurková, CSc., prof. RNDr. Katarína Cechlárová, DrSc., prof. RNDr. Beňadik Šmajda, CSc., prof. Mgr. Jaroslav Hofierka, PhD., doc. RNDr. Ivan Žežula, CSc., doc. RNDr. Vladimír Zelenák, PhD., doc. RNDr. Jozef Hanč, PhD., RNDr. Ondrej Krídlo, PhD., Mgr. Vladislav Kolarčík, PhD., RNDr. Janetta Nestorová-Dická, PhD. |                                                       |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                 |                                                       |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                                                                             |                                                       |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                  |      |                                           |     |     |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                     |      |                                           |     |     |     |
| <b>Course ID:</b> ÚFV/<br>ZBP/04                                                                                                                                                                                                                                                                                                       |      | <b>Course name:</b> Laboratory Training I |     |     |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 <b>Per study period:</b> 28<br><b>Course method:</b> present                                                                                                                                |      |                                           |     |     |     |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                            |      |                                           |     |     |     |
| <b>Recommended semester/trimester of the course:</b> 6.                                                                                                                                                                                                                                                                                |      |                                           |     |     |     |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                |      |                                           |     |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                  |      |                                           |     |     |     |
| <b>Conditions for course completion:</b><br>Test-paper<br>Laboratory protocol                                                                                                                                                                                                                                                          |      |                                           |     |     |     |
| <b>Learning outcomes:</b><br>Completing the course student will get knowledge and first experiences of safe and efficient work in biophysical (chemical, optical spectroscopy) laboratory.                                                                                                                                             |      |                                           |     |     |     |
| <b>Brief outline of the course:</b><br>Introduction to the fundamentals of laboratory safety, chemical safety, and general safety. Characteristics of Solution: characteristic parameters and equations. Safe Operation and Use of Laboratory Equipments. Preparation of solutions and buffers. Working with Spectroscopic Equipments. |      |                                           |     |     |     |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                                                         |      |                                           |     |     |     |
| <b>Course language:</b>                                                                                                                                                                                                                                                                                                                |      |                                           |     |     |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                          |      |                                           |     |     |     |
| <b>Course assessment</b><br>Total number of assessed students: 8                                                                                                                                                                                                                                                                       |      |                                           |     |     |     |
| A                                                                                                                                                                                                                                                                                                                                      | B    | C                                         | D   | E   | FX  |
| 87.5                                                                                                                                                                                                                                                                                                                                   | 12.5 | 0.0                                       | 0.0 | 0.0 | 0.0 |
| <b>Provides:</b> RNDr. Zuzana Jurašková, PhD.                                                                                                                                                                                                                                                                                          |      |                                           |     |     |     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                           |      |                                           |     |     |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                                                       |      |                                           |     |     |     |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                               |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                               |
| <b>Course ID:</b> ÚMV/<br>MAN3a/10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Course name:</b> Mathematical analysis I for informaticians and physicists |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 4 / 3 <b>Per study period:</b> 56 / 42<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                               |
| <b>Number of credits:</b> 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                               |
| <b>Recommended semester/trimester of the course:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                               |
| <b>Course level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                               |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                               |
| <b>Conditions for course completion:</b><br>Continuous assessment is taken the form of small tests and two main tests during the semester. Final evaluation is given by continuous assessment (50%), written and oral part of the exam (50%).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                               |
| <b>Learning outcomes:</b><br>The course provides students with the basics of mathematical analysis necessary to study physics and computer science. The students also learn mathematical culture, notation and mathematical way of thinking and expression.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                               |
| <b>Brief outline of the course:</b> <ol style="list-style-type: none"> <li>1. Introduction - language of mathematics, basics of formal logic.</li> <li>2. Real numbers and sets - ordering, boundedness, infimum, supremum.</li> <li>3. Sequences - boundedness, monotonicity, convergence, subsequences.</li> <li>4. Series - sum, tests for convergence, absolute and relative convergence.</li> <li>5. Functions of one real variable - fundamental concepts, limits and operations with them.</li> <li>6. Continuous functions and their properties on the set (interval). Elementary functions.</li> <li>7. Derivative, differentiability, difference and differential, fundamental theorems of differential calculus.</li> <li>8. Using differential calculus for the investigation of properties of functions and their behavior.</li> <li>9. Other applications of derivative - calculation of limits, Taylor polynomials.</li> <li>10. Power series - radius and range of convergence, properties of the sum of power series, Taylor series.</li> </ol> |                                                                               |
| <b>Recommended literature:</b> <ol style="list-style-type: none"> <li>1. B. Mihalíková, J. Ohriska: Matematická analýza 1, vysokoškolský učebný text, UPJŠ v Košiciach, Košice, 2000 (in Slovak).</li> <li>2. Z. Došlá, J. Kuben: Diferenciální počet funkcí jedné proměnné, vysokoškolský učebný text, Masarykova univerzita v Brně, Brno, 2004 (in Czech).</li> <li>3. D. Brannan: A First Course in Mathematical Analysis, Cambridge University Press, Cambridge, 2006.</li> <li>4. K. A. Ross: Elementary Analysis: The theory of Calculus, Springer, New York, 2010.</li> <li>5. A. Banner: The calculus lifesaver, Princeton university press, Princeton, 2007.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                 |                                                                               |

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|-----------------------------------------------------------------------------------------------------------------------|------|------|-------|-------|-------|
| 6. B. S. Thomson, J. B. Bruckner, A. M. Bruckner: Elementary real analysis, Prentice Hall (Pearson), Lexington, 2008. |      |      |       |       |       |
| 7. J. Stewart: Calculus: Early Transcendentals, Brooks Cole (Thomson), Toronto, 2008.                                 |      |      |       |       |       |
| <b>Course language:</b><br>slovak                                                                                     |      |      |       |       |       |
| <b>Notes:</b>                                                                                                         |      |      |       |       |       |
| <b>Course assessment</b><br>Total number of assessed students: 868                                                    |      |      |       |       |       |
| A                                                                                                                     | B    | C    | D     | E     | FX    |
| 6.57                                                                                                                  | 8.18 | 12.9 | 15.21 | 37.56 | 19.59 |
| <b>Provides:</b> RNDr. Jaroslav Šupina, PhD., RNDr. Lenka Halčinová, PhD.                                             |      |      |       |       |       |
| <b>Date of last modification:</b> 17.09.2015                                                                          |      |      |       |       |       |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                      |      |      |       |       |       |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                |
| <b>Course ID:</b> ÚMV/<br>MAN3b/10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Course name:</b> Mathematical analysis II for informaticians and physicists |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 4 / 3 <b>Per study period:</b> 56 / 42<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                |
| <b>Number of credits:</b> 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                |
| <b>Recommended semester/trimester of the course:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                |
| <b>Course level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                |
| <b>Prerequisites:</b> ÚMV/MAN3a/10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                |
| <b>Conditions for course completion:</b><br>Continuous assessment is taken the form of small tests and two main tests during the semester. Final evaluation is given by continuous assessment (50%), written and oral part of the exam (50%).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                |
| <b>Learning outcomes:</b><br>The course provides students with the basics of mathematical analysis necessary to study physics and computer science. The students also learn mathematical culture, notation and mathematical way of thinking and expression.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                |
| <b>Brief outline of the course:</b><br>1. Integral calculus of functions of one real variable: a) Indefinite integral - primitive function and its properties, techniques of integration; b) Definite Riemann integral - definition, elementary properties, calculation methods, classes of integrable functions, applications; c) Improper integral.<br>2. Ordinary differential equations - basic concepts, the first order equations (separable, homogeneous, linear, Bernoulli), linear equations of the second order (also with constant coefficients).<br>3. Metric space - Euclidean space, some topological properties of points and sets.<br>4. Function of several real variables - basic concepts, limits and continuity.<br>5. Differential calculus of functions of several real variables - partial derivative, differentiability and total differential (also higher order), Taylor polynomials, directional derivative, local and global extrema, constrained local extrema.<br>6. Double (two dimensional) integral - definition, calculation methods, applications. |                                                                                |
| <b>Recommended literature:</b><br>1. L. Kluvánek, I. Mišík, M. Švec: Matematika I, II, SVTL, Bratislava, 1959 (in Slovak).<br>2. Z. Došlá, O. Došlý: Diferenciální počet funkcí více proměnných, vysokoškolský učebný text, Masarykova univerzita v Brně, Brno, 2003 (in Czech).<br>3. J. Eliaš, J. Horváth, J. Kajan: Zbierka úloh z vyššej matematiky 2, 3, 4, Alfa, Bratislava, 1971 (in Slovak).<br>4. J. C. Robinson: An introduction to ordinary differential equations, Cambridge University Press, Cambridge, 2004.<br>5. R. E. Williamson, H. F. Trotter: Multivariable mathematics, Prentice Hall (Pearson), Upper Saddle River, 2004.                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                |

6. B. S. Thomson, J. B. Bruckner, A. M. Bruckner: Elementary Real Analysis, Prentice Hall (Pearson), Lexington, 2008.
7. J. Stewart: Calculus: Early Transcendentals, Brooks Cole (Thomson), Toronto, 2008.

**Course language:**

Slovak

**Notes:**

**Course assessment**

Total number of assessed students: 396

| A    | B    | C     | D     | E    | FX    |
|------|------|-------|-------|------|-------|
| 6.82 | 7.58 | 11.11 | 18.43 | 40.4 | 15.66 |

**Provides:** Mgr. Jozef Kiseľák, PhD., RNDr. Jaroslav Šupina, PhD.

**Date of last modification:** 03.05.2015

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

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                      |       |                                                              |       |       |      |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                         |       |                                                              |       |       |      |
| <b>Course ID:</b> ÚMV/<br>MAN3c/10                                                                                                                                                                                                                                                                                                                                                         |       | <b>Course name:</b> Mathematical analysis III for physicists |       |       |      |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 4 / 2 <b>Per study period:</b> 56 / 28<br><b>Course method:</b> present                                                                                                                                                                 |       |                                                              |       |       |      |
| <b>Number of credits:</b> 8                                                                                                                                                                                                                                                                                                                                                                |       |                                                              |       |       |      |
| <b>Recommended semester/trimester of the course:</b> 3.                                                                                                                                                                                                                                                                                                                                    |       |                                                              |       |       |      |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                    |       |                                                              |       |       |      |
| <b>Prerequisites:</b> ÚMV/MAN3b/10                                                                                                                                                                                                                                                                                                                                                         |       |                                                              |       |       |      |
| <b>Conditions for course completion:</b><br>The exam consists of two parts: written and oral. Final grading takes into account results of midterm exams.                                                                                                                                                                                                                                   |       |                                                              |       |       |      |
| <b>Learning outcomes:</b><br>The aim of this course is to familiarize students with the mathematical apparatus necessary for successful study of physics.                                                                                                                                                                                                                                  |       |                                                              |       |       |      |
| <b>Brief outline of the course:</b><br>Vector-valued functions - curves, surfaces, vector fields, vector calculus, regular transformations. Measure and Lebesgue integral. Parametric integrations. Path, surface integrals and integral theorems. Applications in physics.                                                                                                                |       |                                                              |       |       |      |
| <b>Recommended literature:</b><br>Apostol, T. M. Calculus, 2nd ed., Vol . 2: Multi-Variable Calculus and Linear Algebra, with Applications to Differential Equations and Probability. Waltham, MA: Blaisdell, 1969.<br>Schey H.M. Div, Grad, Curl, and All That: An Informal Text on Vector Calculus, 4th ed., 2005<br>Sharma K. Text Book of Vector Calculus, Discovery Publ. House, 2006 |       |                                                              |       |       |      |
| <b>Course language:</b><br>Slovak or English                                                                                                                                                                                                                                                                                                                                               |       |                                                              |       |       |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                              |       |                                                              |       |       |      |
| <b>Course assessment</b><br>Total number of assessed students: 126                                                                                                                                                                                                                                                                                                                         |       |                                                              |       |       |      |
| A                                                                                                                                                                                                                                                                                                                                                                                          | B     | C                                                            | D     | E     | FX   |
| 24.6                                                                                                                                                                                                                                                                                                                                                                                       | 15.08 | 19.05                                                        | 14.29 | 17.46 | 9.52 |
| <b>Provides:</b> Mgr. Jozef Kiseľák, PhD.                                                                                                                                                                                                                                                                                                                                                  |       |                                                              |       |       |      |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                               |       |                                                              |       |       |      |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                                                                                                           |       |                                                              |       |       |      |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                     |       |                                                             |       |       |      |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                        |       |                                                             |       |       |      |
| <b>Course ID:</b> ÚMV/<br>MAN3d/10                                                                                                                                                                                                                                                                                                                                                                        |       | <b>Course name:</b> Mathematical analysis IV for physicists |       |       |      |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 / 2 <b>Per study period:</b> 28 / 28<br><b>Course method:</b> present                                                                                                                                                                                |       |                                                             |       |       |      |
| <b>Number of credits:</b> 6                                                                                                                                                                                                                                                                                                                                                                               |       |                                                             |       |       |      |
| <b>Recommended semester/trimester of the course:</b> 4.                                                                                                                                                                                                                                                                                                                                                   |       |                                                             |       |       |      |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                             |       |       |      |
| <b>Prerequisites:</b> ÚMV/MAN3c/10                                                                                                                                                                                                                                                                                                                                                                        |       |                                                             |       |       |      |
| <b>Conditions for course completion:</b><br>The exam consists of two parts: written and oral. Final grading takes into account results of midterm exams.                                                                                                                                                                                                                                                  |       |                                                             |       |       |      |
| <b>Learning outcomes:</b><br>The aim of this course is to familiarize students with the mathematical apparatus necessary for successful study of physics.                                                                                                                                                                                                                                                 |       |                                                             |       |       |      |
| <b>Brief outline of the course:</b><br>Systems of differential equations - existence, uniqueness and stability of solutions, first integrals, approximate solutions. Normed and Hilbert spaces. Fourier series. Fourier integral, Fourier and Laplace transform.                                                                                                                                          |       |                                                             |       |       |      |
| <b>Recommended literature:</b><br>Tenenbaum M., Pollard H. Ordinary Differential Equations, Dover Publications, New York 1985<br>Chicone C. Ordinary Differential Equations with Applications, Springer, 2nd. ed., 2006<br>Davis, H. F. Fourier Series and Orthogonal Functions, Dover Publications, 1989<br>Brown J., Churchill R. Fourier Series and Boundary Value Problems, McGraw-Hill, 5th ed. 2006 |       |                                                             |       |       |      |
| <b>Course language:</b><br>Slovak or English                                                                                                                                                                                                                                                                                                                                                              |       |                                                             |       |       |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                             |       |                                                             |       |       |      |
| <b>Course assessment</b><br>Total number of assessed students: 124                                                                                                                                                                                                                                                                                                                                        |       |                                                             |       |       |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                         | B     | C                                                           | D     | E     | FX   |
| 25.81                                                                                                                                                                                                                                                                                                                                                                                                     | 15.32 | 13.71                                                       | 16.13 | 20.97 | 8.06 |
| <b>Provides:</b> Mgr. Jozef Kiseľák, PhD.                                                                                                                                                                                                                                                                                                                                                                 |       |                                                             |       |       |      |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                                              |       |                                                             |       |       |      |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                                                                                                                          |       |                                                             |       |       |      |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                          |       |       |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                          |       |       |     |
| <b>Course ID:</b> ÚFV/MFY/12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       | <b>Course name:</b> Mathematical Physics |       |       |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 3 / 1 <b>Per study period:</b> 42 / 14<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                          |       |                                          |       |       |     |
| <b>Number of credits:</b> 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                          |       |       |     |
| <b>Recommended semester/trimester of the course:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                          |       |       |     |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                          |       |       |     |
| <b>Prerequisites:</b> ÚMV/MAN3b/10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                          |       |       |     |
| <b>Conditions for course completion:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                          |       |       |     |
| <b>Learning outcomes:</b><br>The goal of this course is to continue in the study of mathematical analysis with emphasize on the special techniques used in advanced branches of physics.                                                                                                                                                                                                                                                                                                                                            |       |                                          |       |       |     |
| <b>Brief outline of the course:</b><br>Sturm-Liouville problem. Legendre's equation and polynomials. Solution of Legendre's equation. Properties of Legendre's polynomials. Operators in curvilinear coordinates. Lamé's coefficients. Solution of Laplace's equation in spherical coordinates. Properties of spherical functions.<br>Special functions: Hermite's polynomials, Laguerre's polynomials, Bessel's functions, Gamma function.<br>Laplace transform. Classification of the second order linear differential equations. |       |                                          |       |       |     |
| <b>Recommended literature:</b><br>J. Ray Hanna, J. H. Rowland : Fourier Series, Transforms, and Boundary Value Problems.<br>Tai L. Chow : Mathematical Methods for Physicists.<br>J. Goldberg, M. Potter : Differential Equations.<br>G. B. Arfken , H. J. Weber : Mathematical Methods for Physicists, Harbourt Academic Press 2011.                                                                                                                                                                                               |       |                                          |       |       |     |
| <b>Course language:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                          |       |       |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                          |       |       |     |
| <b>Course assessment</b><br>Total number of assessed students: 41                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                          |       |       |     |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | B     | C                                        | D     | E     | FX  |
| 24.39                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 21.95 | 7.32                                     | 17.07 | 29.27 | 0.0 |
| <b>Provides:</b> RNDr. Tomáš Lučivjanský, PhD., RNDr. Marián Jurčíšin, PhD.                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                          |       |       |     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                          |       |       |     |

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

## COURSE INFORMATION LETTER

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                    |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                    |
| <b>Course ID:</b> ÚFV/<br>MSA1/03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Course name:</b> Methods of Structural Analysis |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 3 / 2 <b>Per study period:</b> 42 / 28<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                    |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                    |
| <b>Recommended semester/trimester of the course:</b> 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                    |
| <b>Course level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                    |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                    |
| <b>Conditions for course completion:</b><br>Final written exams form both topics: EM and X-ray diffractometry - 25%<br>Experimental projects from both topics: light and electron microscopy and X-ray diffractometry - 75%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                    |
| <b>Learning outcomes:</b><br>The course is oriented on modern methods of structural analysis of metals. Main topics are: optic microscopy, electron microscopy (TEM, SEM), electron microprobe analysis and X-ray diffractometry.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                    |
| <b>Brief outline of the course:</b><br>Optic microscopy. Electron microscopy: Electron beam instruments, Electron optics, Electron lenses and deflection systems, Transmission electron microscopy - principle and construction. Electron – specimen interactions. Electron diffraction. Kikuchi lines. Scanning electron microscopy – principle and construction. Scanning transmission electron microscopy. High Voltage electron microscopy. Electron microprobe analysis: WDX spectrometer, EDX spectrometer, Auger electron spectrometer. Self-emission microscopy. Convergent beam diffraction.<br>X-ray diffractometry: Scattering of x-rays, Neutrons and neutron scattering, CW - diffractometer, Ewald's sphere, Diffraction on powder samples, The main characteristics of powder diffraction pattern, Structure factor, Occupation factor, Atomic displacement factor, Peak intensity, shape and symmetry, Scherrer equation. Peak profile, Rietveld method. Qualitative phase analysis, parameters of elementary cell, Profile analysis of diffraction peak and interpretation of profile analysis. |                                                    |
| <b>Recommended literature:</b><br>1. S. Amelinckx, D. van Dyck, J. van Landuyt, Electron Microscopy – Principles and Fundamentals of Electron Microscopy, VCH, 1997.<br>2. M.H. Loretto, Electron beam analysis of materials. Springer, 2002.<br>3. Fundamentals of Powder Diffraction and Structural Characterization of Materials, Vitalij K. Pecharsky & Peter Y. Zavalij, Kluwer Academic Publishers, 2003.<br>4. Structure Determination from Powder Diffraction Data, Edited by W.I.F. David, K. Shankland, L.B. McCusker, C. Bärlocher, Oxford University Press, 2006                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                    |
| <b>Course language:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                    |

|                                                                                                     |       |       |      |     |     |
|-----------------------------------------------------------------------------------------------------|-------|-------|------|-----|-----|
| English                                                                                             |       |       |      |     |     |
| <b>Notes:</b>                                                                                       |       |       |      |     |     |
| <b>Course assessment</b>                                                                            |       |       |      |     |     |
| Total number of assessed students: 38                                                               |       |       |      |     |     |
| A                                                                                                   | B     | C     | D    | E   | FX  |
| 55.26                                                                                               | 26.32 | 15.79 | 2.63 | 0.0 | 0.0 |
| <b>Provides:</b> prof. RNDr. Pavol Sovák, CSc., Ing. Karel Saksl, DrSc., Ing. Vladimír Girman, PhD. |       |       |      |     |     |
| <b>Date of last modification:</b> 03.05.2015                                                        |       |       |      |     |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                    |       |       |      |     |     |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                              |
| <b>Course ID:</b> ÚFV/<br>MTF/07                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Course name:</b> Modern Trends in Physics |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 3 <b>Per study period:</b> 42<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                              |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                              |
| <b>Recommended semester/trimester of the course:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                              |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                              |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |
| <b>Conditions for course completion:</b><br>test<br>test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                              |
| <b>Learning outcomes:</b><br>Presentation of scientific goals and experimental facilities on the Institute of Physics. Discussion of new trends in physics of micro-world, astrophysics, biophysics and physics of condensed matter.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                              |
| <b>Brief outline of the course:</b><br>The present state of the micro-world physics – fundamental particles and the interaction forces. Theoretical description of the micro-world – the Standard Model. Experimental tests of the Standard Model - the discovery of neutral currents and intermediate $W^{+-}$ , $Z^0$ bosons. Heavy ion collisions and the search for new state of matter - quark gluon plasma - on the most powerful accelerators RHIC (Relativistic Heavy Ion Collider), Brookhaven National Laboratory) , USA and on the constructed LHC (Large Hadron Collider), CERN, Geneva. Big Bang and the quark gluon plasma. Some open questions – search for Higgs boson, responsible for the mass of fundamental particles and quark gluon plasma in laboratory conditions.<br>Practical activities – demonstration of the knowledge from lectures at identification of the real $Z^0$ decay events in experimental data from the LEP accelerator, CERN, Switzerland.<br>New trends in astrophysical investigation: Solar system planets and exoplanets; cataclysmic variables, blazars and polars; black holes; quasars and active galactic nuclei, clusters of galaxies and web structure of Universe; gravitational lensing, dark matter and dark energy; gamma ray bursts.<br>Topical problems in biophysics<br>Low temperatures as a tool for the study of physical properties of matter. Non-Fermi liquid materials... Geometrically frustrated systems. Quantum tunneling in molecular magnets. Application of quantum magnets. Excursion in the Centre of Excellence of Low Temperature Physics.<br>Soft magnetic nanostructure materials prepared by milling and alloying: magnetic properties of small particles, magnetization processes, domain structure, milling and alloying. |                                              |
| <b>Recommended literature:</b><br>S. Chikazumi: Physics of Magnetism, J. Willey and Sons, Inc. New York, London, Sydney, 1997.<br>C. Suryanarayana, Progress in Materials Science 46 (2001), 1-184                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                              |

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| F. Close : The Cosmic Onion, 1990<br>Cindy Schwarz :A Tour of the Subatomic Zoo, 1997<br>Frank Close, Michael Marten, Christine Sutton : The Particle Odyssey-<br>A Journey to the Heart of Matter, 2002<br><a href="http://vk.upjs.sk/~epog/2006/">http://vk.upjs.sk/~epog/2006/</a><br>Scientific journals |     |
| <b>Course language:</b><br>english                                                                                                                                                                                                                                                                           |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                |     |
| <b>Course assessment</b><br>Total number of assessed students: 55                                                                                                                                                                                                                                            |     |
| abs                                                                                                                                                                                                                                                                                                          | n   |
| 100.0                                                                                                                                                                                                                                                                                                        | 0.0 |
| <b>Provides:</b> Dr.h.c. prof. RNDr. Alexander Feher, DrSc.                                                                                                                                                                                                                                                  |     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                 |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                             |     |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |                                       |     |     |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |     |                                       |     |     |     |
| <b>Course ID:</b> ÚBEV/<br>MOB2/10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |     | <b>Course name:</b> Molecular Biology |     |     |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 3 <b>Per study period:</b> 42<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |                                       |     |     |     |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |                                       |     |     |     |
| <b>Recommended semester/trimester of the course:</b> 4., 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |                                       |     |     |     |
| <b>Course level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |                                       |     |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |                                       |     |     |     |
| <b>Conditions for course completion:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |     |                                       |     |     |     |
| <b>Learning outcomes:</b><br>Familiarize students with the structure, properties and functions of information macromolecules and their work, focusing primarily on the molecular mechanisms of regulation of DNA replication, gene expression and cell cycle.                                                                                                                                                                                                                                                                                                                                                                          |     |                                       |     |     |     |
| <b>Brief outline of the course:</b><br>Structure and properties of information macromolecules. Molecular structure of chromatin and mitotic and meiotic chromosomes. Dynamics of chromosomes. Replication of chromosomal and extrachromosomal DNA. Repair of DNA damage. Genome of prokaryotic and eukaryotic cells. The human genome. Mobile genetic elements. Transcription and posttranscriptional modifications and editing. Translation and posttranslational modifications. Specific protein degradation. DNA-protein interactions. Regulation of the expression of prokaryotic and eukaryotic genes. Control of the cell cycle. |     |                                       |     |     |     |
| <b>Recommended literature:</b><br>E. Mišúrová: Molekulárna biológia. Učebné texty, PF UPJŠ Košice, 1999<br>E. Mišúrová, P. Solár: Molekulová biológia. Učebné texty, PF UPJŠ, 2007<br>S. Rosypal: Úvod do molekulární biologie. Grafex Blansko, Brno, 1999<br>Alberts, D. Bray, J. Lewis a kol.: Molecular Biology of the Cell, Academic Press, London, 1994<br>D.P. Clark: Molecular Biology, Elsevier Academic Press, London, 2005                                                                                                                                                                                                   |     |                                       |     |     |     |
| <b>Course language:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                                       |     |     |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |     |                                       |     |     |     |
| <b>Course assessment</b><br>Total number of assessed students: 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |                                       |     |     |     |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | B   | C                                     | D   | E   | FX  |
| 0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.0 | 0.0                                   | 0.0 | 0.0 | 0.0 |
| <b>Provides:</b> doc. RNDr. Peter Solár, PhD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |     |                                       |     |     |     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |                                       |     |     |     |

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

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                     |                                    |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                        |                                    |
| <b>Course ID:</b> ÚTVŠ/<br>NJ//13                                                                                                                                                                         | <b>Course name:</b> Naval Yachting |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 36 <b>Per study period:</b> 504<br><b>Course method:</b> present |                                    |
| <b>Number of credits:</b> 2                                                                                                                                                                               |                                    |
| <b>Recommended semester/trimester of the course:</b>                                                                                                                                                      |                                    |
| <b>Course level:</b> I., II.                                                                                                                                                                              |                                    |
| <b>Prerequisites:</b>                                                                                                                                                                                     |                                    |
| <b>Conditions for course completion:</b>                                                                                                                                                                  |                                    |
| <b>Learning outcomes:</b>                                                                                                                                                                                 |                                    |
| <b>Brief outline of the course:</b>                                                                                                                                                                       |                                    |
| <b>Recommended literature:</b>                                                                                                                                                                            |                                    |
| <b>Course language:</b>                                                                                                                                                                                   |                                    |
| <b>Notes:</b>                                                                                                                                                                                             |                                    |
| <b>Course assessment</b><br>Total number of assessed students: 2                                                                                                                                          |                                    |
| abs                                                                                                                                                                                                       | n                                  |
| 100.0                                                                                                                                                                                                     | 0.0                                |
| <b>Provides:</b> doc. Mgr. Rastislav Feč, PhD.                                                                                                                                                            |                                    |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                              |                                    |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                          |                                    |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                  |      |                                                      |      |      |      |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                     |      |                                                      |      |      |      |
| <b>Course ID:</b> ÚFV/JZP1/03                                                                                                                                                                                                                                                                                                                                                                          |      | <b>Course name:</b> Nuclear Radiation in Environment |      |      |      |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 <b>Per study period:</b> 28<br><b>Course method:</b> present                                                                                                                                                                                                 |      |                                                      |      |      |      |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                            |      |                                                      |      |      |      |
| <b>Recommended semester/trimester of the course:</b> 6.                                                                                                                                                                                                                                                                                                                                                |      |                                                      |      |      |      |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                |      |                                                      |      |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                  |      |                                                      |      |      |      |
| <b>Conditions for course completion:</b><br>term project<br>examination                                                                                                                                                                                                                                                                                                                                |      |                                                      |      |      |      |
| <b>Learning outcomes:</b><br>Basic knowledge of the nuclear radiation in the environment and consequences for health.                                                                                                                                                                                                                                                                                  |      |                                                      |      |      |      |
| <b>Brief outline of the course:</b><br>Sources of radiation. Interaction of radiation with matter. Dosimetry units. Biological effects of ionizing radiation and radiological protection. Natural sources of radiation. Man-made sources of radionuclides. Application of radionuclides.<br>Nuclear weapons. Nuclear plants. The risk of accidents. Nuclear waste. Reprocessing. Radiation and health. |      |                                                      |      |      |      |
| <b>Recommended literature:</b><br>1. Cooper J.R, Randle K., Sokhi R.S.: Radioactive releases in the environment, J.Wiley & Sons, Ltd. 2003<br>2. R. L. Murray, Nuclear Energy, An Introduction to th Concepts, Systems, and Applications of Nuclear Processes, 6th edition, Elsevier, 2009<br>3. P.A.Tipler, R.A.Llewellyn: Modern Physics, 6th Edition, W.H.Freeman and Company, 2012                 |      |                                                      |      |      |      |
| <b>Course language:</b><br>slovak                                                                                                                                                                                                                                                                                                                                                                      |      |                                                      |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                          |      |                                                      |      |      |      |
| <b>Course assessment</b><br>Total number of assessed students: 45                                                                                                                                                                                                                                                                                                                                      |      |                                                      |      |      |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                      | B    | C                                                    | D    | E    | FX   |
| 55.56                                                                                                                                                                                                                                                                                                                                                                                                  | 20.0 | 8.89                                                 | 8.89 | 2.22 | 4.44 |
| <b>Provides:</b> RNDr. Janka Vrláková, PhD.                                                                                                                                                                                                                                                                                                                                                            |      |                                                      |      |      |      |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                                           |      |                                                      |      |      |      |

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

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                       |       |       |      |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                       |       |       |      |
| <b>Course ID:</b> ÚFV/<br>NUM/10                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       | <b>Course name:</b> Numerical Methods |       |       |      |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14<br><b>Course method:</b> present                                                                                                                                                                                                                                                                  |       |                                       |       |       |      |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                       |       |       |      |
| <b>Recommended semester/trimester of the course:</b> 3.                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                       |       |       |      |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                       |       |       |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                       |       |       |      |
| <b>Conditions for course completion:</b><br>Continuous evaluation is based on students' activity in the classroom and work on assignments.<br>Evaluation                                                                                                                                                                                                                                                                                                                                    |       |                                       |       |       |      |
| <b>Learning outcomes:</b><br>To acquaint students with basic numerical methods of calculus and algebra, which are necessary for the subsequent course of computational physics.                                                                                                                                                                                                                                                                                                             |       |                                       |       |       |      |
| <b>Brief outline of the course:</b><br>Computational solutions of physical problems and computational errors. Approximation and interpolation of functions. Fast Fourier transform. Linear systems of equations - direct and iterative methods. Nonlinear systems of equations. Conditions of convergence and assesment of error. Numerical derrivatives and quadrature. Matrix operations, determinants and inverse matrices. Eigenvalues and eigenvectors - partial and complete problem. |       |                                       |       |       |      |
| <b>Recommended literature:</b><br>1. C. Pozrikidis: Numerical Computation in Science and Engineering, Oxford University Press, 1998.<br>2. R.W. Hamming: Numerical Methods for Scientists and Engineers, Dover, 1973.<br>3. A.L. Garcia: Numerical Methods for Physics, Prentice-Hall, 1994.                                                                                                                                                                                                |       |                                       |       |       |      |
| <b>Course language:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                       |       |       |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                       |       |       |      |
| <b>Course assessment</b><br>Total number of assessed students: 54                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                       |       |       |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | B     | C                                     | D     | E     | FX   |
| 18.52                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 16.67 | 16.67                                 | 29.63 | 11.11 | 7.41 |
| <b>Provides:</b> doc. RNDr. Milan Žukovič, PhD.                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                       |       |       |      |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                       |       |       |      |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                       |       |       |      |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                     |      |                                                   |      |     |     |     |       |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                        |      |                                                   |      |     |     |     |       |
| <b>Course ID:</b> ÚFV/<br>FMJ/06                                                                                                                                                                                                                                                          |      | <b>Course name:</b> Physics of Magnetic Phenomena |      |     |     |     |       |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 <b>Per study period:</b> 28<br><b>Course method:</b> present                                                                                    |      |                                                   |      |     |     |     |       |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                               |      |                                                   |      |     |     |     |       |
| <b>Recommended semester/trimester of the course:</b> 5.                                                                                                                                                                                                                                   |      |                                                   |      |     |     |     |       |
| <b>Course level:</b> I., III.                                                                                                                                                                                                                                                             |      |                                                   |      |     |     |     |       |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                     |      |                                                   |      |     |     |     |       |
| <b>Conditions for course completion:</b><br>Exam                                                                                                                                                                                                                                          |      |                                                   |      |     |     |     |       |
| <b>Learning outcomes:</b><br>The aim of the subject is to give overview to the physical mechanism of the magnetization process.                                                                                                                                                           |      |                                                   |      |     |     |     |       |
| <b>Brief outline of the course:</b><br>Basic units for magnetic material characterization. Magnetic materials. Magnetic anisotropies. Magnetic parameters. Domain structure. Magnetization processes. Dynamics of magnetization processes.                                                |      |                                                   |      |     |     |     |       |
| <b>Recommended literature:</b><br>1; B.D. Cullity and C.D. Graham, Introduction to magnetic materials, Willey-IEEE Press, 2007<br>2; S. Chikazumi, Physics of Ferromagnetism, Claredon Press, 1997<br>3; C.W. Chen, Magnetism and metallurgy of soft magnetic materials, Dover Publ.,1986 |      |                                                   |      |     |     |     |       |
| <b>Course language:</b><br>slovak or english                                                                                                                                                                                                                                              |      |                                                   |      |     |     |     |       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                             |      |                                                   |      |     |     |     |       |
| <b>Course assessment</b><br>Total number of assessed students: 45                                                                                                                                                                                                                         |      |                                                   |      |     |     |     |       |
| A                                                                                                                                                                                                                                                                                         | B    | C                                                 | D    | E   | FX  | N   | P     |
| 66.67                                                                                                                                                                                                                                                                                     | 4.44 | 2.22                                              | 2.22 | 0.0 | 0.0 | 0.0 | 24.44 |
| <b>Provides:</b> prof. RNDr. Rastislav Varga, DrSc.                                                                                                                                                                                                                                       |      |                                                   |      |     |     |     |       |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                              |      |                                                   |      |     |     |     |       |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                          |      |                                                   |      |     |     |     |       |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                         |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                         |
| <b>Course ID:</b> ÚFV/<br>ZFP1a/03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Course name:</b> Physics Practical I |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 3 <b>Per study period:</b> 42<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                         |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                         |
| <b>Recommended semester/trimester of the course:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                         |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                         |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                         |
| <b>Conditions for course completion:</b><br>The active work during semester and hand in all reports.<br>Vindication of reports.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                         |
| <b>Learning outcomes:</b><br>Developing proper laboratory habits, skills and verify their theoretical knowledge.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                         |
| <b>Brief outline of the course:</b><br>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.<br>Laboratory assignment: <ol style="list-style-type: none"> <li>1. Density measurements of liquids and solids.</li> <li>2. Radius measurements of spherical cap. Measurements of surface using planimeter.</li> <li>3. Gravitational acceleration measurements using mathematical and physical pendulum.</li> <li>4. Moment of inertia measurement using physical and torsion pendulum.</li> <li>5. Measurements of Young's modulus.</li> <li>6. Measurement of coefficient of viscosity.</li> <li>7. Measurement of the speed of sound.</li> <li>8. Measurements of general gas constant and Boltzmann constant.</li> <li>9. Measurements of thermal expansivity of air.</li> <li>10. Measurements of thermal capacity of matter.</li> <li>11. Measurement of the surface tension.</li> </ol> |                                         |
| <b>Recommended literature:</b><br>Degro, J., Ješková, Z., Onderová, L., Kireš, M.: Základné fyzikálne praktikum I. (Basic physical measurements I), Ed. PF UPJŠ Košice 2007.<br>Standards STN ISO 31. Slovenský inštitút normalizácie v Bratislave (Slovak institute of technical standards in Bratislava), 1997.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                         |

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|------|------|-----|
| Ješková, Z.: Computer based experiments in thermodynamics using IP COACH,ed. PF UPJŠ in Košice, 2004.                                                                         |       |       |      |      |     |
| <b>Course language:</b><br>english                                                                                                                                            |       |       |      |      |     |
| <b>Notes:</b>                                                                                                                                                                 |       |       |      |      |     |
| <b>Course assessment</b><br>Total number of assessed students: 185                                                                                                            |       |       |      |      |     |
| A                                                                                                                                                                             | B     | C     | D    | E    | FX  |
| 55.14                                                                                                                                                                         | 27.03 | 11.89 | 4.86 | 1.08 | 0.0 |
| <b>Provides:</b> doc. RNDr. Adriana Zeleňáková, PhD., doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Marián Kireš, PhD., doc. RNDr. Ján Füzér, PhD., doc. RNDr. Jozef Hanč, PhD. |       |       |      |      |     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                  |       |       |      |      |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                              |       |       |      |      |     |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                     |       |                                          |      |     |      |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                        |       |                                          |      |     |      |
| <b>Course ID:</b> ÚFV/<br>ZFP1b/03                                                                                                                                                                                                                                                                                        |       | <b>Course name:</b> Physics Practical II |      |     |      |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 3 <b>Per study period:</b> 42<br><b>Course method:</b> present                                                                                                                   |       |                                          |      |     |      |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                               |       |                                          |      |     |      |
| <b>Recommended semester/trimester of the course:</b> 3.                                                                                                                                                                                                                                                                   |       |                                          |      |     |      |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                   |       |                                          |      |     |      |
| <b>Prerequisites:</b> ÚFV/ZFP1a/03                                                                                                                                                                                                                                                                                        |       |                                          |      |     |      |
| <b>Conditions for course completion:</b><br>Measuring of experimental tasks, their appreciation in the form of a written report, defending.<br>Further evaluation is also a good theoretical preparation for the measurement of the task.                                                                                 |       |                                          |      |     |      |
| <b>Learning outcomes:</b><br>The objectives of the laboratory are:<br>a. To gain some physical insight into some of the concepts presented in the lectures.<br>b. To gain some practice in data collection, analysis and interpretation of results.<br>c. To gain experience and report writing presentation and results. |       |                                          |      |     |      |
| <b>Brief outline of the course:</b><br>Students on practical exercises are working in pairs experimental tasks in the field of electrical, electromagnetic and magnetic properties of matters.                                                                                                                            |       |                                          |      |     |      |
| <b>Recommended literature:</b><br>Tumanski S, Handbook of magnetic measurements, CRC press, 2011.<br>Fiorillo F, Characterization and Measurement of Magnetic Materials, Elsevier, 2004.                                                                                                                                  |       |                                          |      |     |      |
| <b>Course language:</b><br>Slovak                                                                                                                                                                                                                                                                                         |       |                                          |      |     |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                             |       |                                          |      |     |      |
| <b>Course assessment</b><br>Total number of assessed students: 155                                                                                                                                                                                                                                                        |       |                                          |      |     |      |
| A                                                                                                                                                                                                                                                                                                                         | B     | C                                        | D    | E   | FX   |
| 61.94                                                                                                                                                                                                                                                                                                                     | 20.65 | 14.84                                    | 1.94 | 0.0 | 0.65 |
| <b>Provides:</b> doc. RNDr. Adriana Zelenáková, PhD., doc. RNDr. Ján Füzer, PhD.                                                                                                                                                                                                                                          |       |                                          |      |     |      |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                              |       |                                          |      |     |      |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                                          |       |                                          |      |     |      |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                 |      |                                           |     |     |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                    |      |                                           |     |     |     |
| <b>Course ID:</b> ÚFV/<br>ZFP1c/14                                                                                                                                                                                                                                                                    |      | <b>Course name:</b> Physics Practical III |     |     |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 3 <b>Per study period:</b> 42<br><b>Course method:</b> present                                                                                               |      |                                           |     |     |     |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                           |      |                                           |     |     |     |
| <b>Recommended semester/trimester of the course:</b> 4.                                                                                                                                                                                                                                               |      |                                           |     |     |     |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                               |      |                                           |     |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                 |      |                                           |     |     |     |
| <b>Conditions for course completion:</b><br>Measurements of experimental tasks, their evaluation in the form of a written report, which must be defended. As a part of evaluation there is also a good theoretical preparation for the measurement of the task.                                       |      |                                           |     |     |     |
| <b>Learning outcomes:</b><br>To gain some physical inside into some of the concepts presented in the lectures. b. To gain some practice in data collection, analysis and interpretation of resumance. c. To gain experience and report writing presentation and results.                              |      |                                           |     |     |     |
| <b>Brief outline of the course:</b><br>Oscilations. Pendulum. Composition and decomposition of oscillations. Resonance. The speed of sound. Refractive index. Lense's focal length. Interference. Diffraction. Diffraction and reflection of waves. Polarization. The speed of light. Quantum optics. |      |                                           |     |     |     |
| <b>Recommended literature:</b><br>Degro,J., Ješková, Z., Onderová,L., Kireš,M.: Základné fyzikálne praktikum I, PF UPJŠ Košice, 2006<br>P. Kollár a kol. Základné fyzikálne praktikum II, PF UPJŠ Košice, 2006<br>J. Brož Základy fyzikálných měření, SPN Praha, 1981.                                |      |                                           |     |     |     |
| <b>Course language:</b><br>slovak or english                                                                                                                                                                                                                                                          |      |                                           |     |     |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                         |      |                                           |     |     |     |
| <b>Course assessment</b><br>Total number of assessed students: 12                                                                                                                                                                                                                                     |      |                                           |     |     |     |
| A                                                                                                                                                                                                                                                                                                     | B    | C                                         | D   | E   | FX  |
| 83.33                                                                                                                                                                                                                                                                                                 | 8.33 | 8.33                                      | 0.0 | 0.0 | 0.0 |
| <b>Provides:</b> doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Marián Kireš, PhD., doc. RNDr. Ján Fúzer, PhD.                                                                                                                                                                                           |      |                                           |     |     |     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                          |      |                                           |     |     |     |

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

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                          |     |     |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                          |     |     |     |
| <b>Course ID:</b> ÚFV/<br>ZFP1d/14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       | <b>Course name:</b> Physics Practical IV |     |     |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 3 <b>Per study period:</b> 42<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                 |       |                                          |     |     |     |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                          |     |     |     |
| <b>Recommended semester/trimester of the course:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                          |     |     |     |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                          |     |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                          |     |     |     |
| <b>Conditions for course completion:</b><br>good theoretical preparation for measurement of the tasks, written tests,measurements of the experimental tasks, written reports of measurements                                                                                                                                                                                                                                                                                                                                            |       |                                          |     |     |     |
| <b>Learning outcomes:</b><br>Practice in nuclear physics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                          |     |     |     |
| <b>Brief outline of the course:</b><br>Introduction to measurements. Dosimetry measurements. Analysing power of coincidence circuit by random coincidences. Statistic distribution of measured quantities. Measurement time scale selection. Absorption of beta rays. Backward scattering of beta rays. Scintillation gamma spectrometer. Determination of 60Co preparat activity using beta-gamma coincidences. Emulsion detector. Franck Hertz experiment. Beta - spectroscopy.Energy dependence of the gamma-absorption coefficient. |       |                                          |     |     |     |
| <b>Recommended literature:</b><br>1. J.Vrláková, S.Vokál: Základné fyzikálne praktikum III, skriptá PF UPJŠ, Košice, 2012, dostupné na <a href="http://www.upjs.sk/public/media/5596/Zakladne-fyzikalne-praktikum-III.pdf">http://www.upjs.sk/public/media/5596/Zakladne-fyzikalne-praktikum-III.pdf</a>                                                                                                                                                                                                                                |       |                                          |     |     |     |
| <b>Course language:</b><br>slovak                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                          |     |     |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                          |     |     |     |
| <b>Course assessment</b><br>Total number of assessed students: 23                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                          |     |     |     |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | B     | C                                        | D   | E   | FX  |
| 86.96                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 13.04 | 0.0                                      | 0.0 | 0.0 | 0.0 |
| <b>Provides:</b> RNDr. Janka Vrláková, PhD., RNDr. Adela Kravčáková, PhD.                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                          |     |     |     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                          |     |     |     |

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

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                       |     |       |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                       |     |       |     |
| <b>Course ID:</b> ÚFV/<br>KVM I/11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       | <b>Course name:</b> Quantum Mechanics |     |       |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 4 / 2 <b>Per study period:</b> 56 / 28<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                                                            |       |                                       |     |       |     |
| <b>Number of credits:</b> 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                       |     |       |     |
| <b>Recommended semester/trimester of the course:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                       |     |       |     |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                       |     |       |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                       |     |       |     |
| <b>Conditions for course completion:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                       |     |       |     |
| <b>Learning outcomes:</b><br>To become familiar with elementary principles of quantum mechanics and to illustrate its possible applications on selected examples.                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                       |     |       |     |
| <b>Brief outline of the course:</b><br>A subject matter, experimental and theoretical foundations of quantum mechanics (QM). Basic axioms of QM. Schrödinger equation and its solution for a square potential well, harmonic oscillator and spherically symmetric potentials. Tunnel effect and over-barrier reflection. Spin and Pauli matrices. Systems of identical particles, bosons, fermions and Pauli exclusion principle.                                                                                                                                                                     |       |                                       |     |       |     |
| <b>Recommended literature:</b><br>1. Ľ. Tóth, M. Tóthová, Kvantová a štatistická fyzika I, Rektorát Univerzity P. J. Šafárika, 1982. (in Slovak language)<br>2. Ľ. Skála, Úvod do kvantovej mechaniky, Academia, Praha, 2005. (in Czech language)<br>3. J. Pišút, L. Gomolčák, Úvod do kvantovej mechaniky, Bratislava 1983. (in Slovak language)<br>4. W. Greiner, Quantum Mechanics, 4th edition, Springer, Berlin, 2000.<br>5. A. C. Philips, Introduction to Quantum Mechanics, Wiley, Weinheim, 2003.<br>6. D. J. Griffiths, Introduction to Quantum Mechanics, Prentice Hall, New Jersey, 1995. |       |                                       |     |       |     |
| <b>Course language:</b><br>EN - english                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                       |     |       |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                       |     |       |     |
| <b>Course assessment</b><br>Total number of assessed students: 46                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                       |     |       |     |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | B     | C                                     | D   | E     | FX  |
| 30.43                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 13.04 | 26.09                                 | 8.7 | 21.74 | 0.0 |
| <b>Provides:</b> doc. RNDr. Jozef Strečka, PhD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                       |     |       |     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                       |     |       |     |

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

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                           |      |       |      |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                           |      |       |      |
| <b>Course ID:</b> ÚFV/<br>KVM II/08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       | <b>Course name:</b> Quantum Mechanics II. |      |       |      |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 3 / 1 <b>Per study period:</b> 42 / 14<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                                                             |       |                                           |      |       |      |
| <b>Number of credits:</b> 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                           |      |       |      |
| <b>Recommended semester/trimester of the course:</b> 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                           |      |       |      |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                           |      |       |      |
| <b>Prerequisites:</b> ÚFV/KVM/08 or ÚFV/KVM I/11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                           |      |       |      |
| <b>Conditions for course completion:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                           |      |       |      |
| <b>Learning outcomes:</b><br>To become familiar with the approximate methods of quantum mechanics and their applications by theoretical investigations of many-particle quantum systems.                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                           |      |       |      |
| <b>Brief outline of the course:</b><br>The stationary and non-stationary perturbation theory for quantum-mechanical systems with a discrete, continuous and discrete-continuous energy spectrum. The special cases of constant, adiabatic and harmonic perturbations. Anharmonic oscillator. The hydrogen atom in the external electric and magnetic field, Stark effect, normal and anomalous Zeeman effect. Ritz variational method and its applications. Many-particle quantum-mechanical systems, atoms and molecules. The helium atom and the hydrogen molecule. Hartree and Hartree-Fock method. |       |                                           |      |       |      |
| <b>Recommended literature:</b><br>1. V. Ilkovič, Kvantová teória II, Scriptum UPJŠ, Košice, 1989. (in Slovak)<br>2. J. Pišút, L. Gomolčák, Úvod do kvantovej mechaniky, Bratislava 1983. (in Slovak)<br>3. W. Greiner, Quantum Mechanics, 4th edition, Springer, Berlin, 2000.<br>4. D. J. Griffiths, Introduction to Quantum Mechanics, Prentice Hall, New Jersey, 1995.                                                                                                                                                                                                                              |       |                                           |      |       |      |
| <b>Course language:</b><br>EN - english                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                           |      |       |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                           |      |       |      |
| <b>Course assessment</b><br>Total number of assessed students: 70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                           |      |       |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | B     | C                                         | D    | E     | FX   |
| 38.57                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 15.71 | 17.14                                     | 7.14 | 18.57 | 2.86 |
| <b>Provides:</b> doc. RNDr. Jozef Strečka, PhD., RNDr. Tomáš Lučivjanský, PhD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                           |      |       |      |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                           |      |       |      |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                           |      |       |      |

## COURSE INFORMATION LETTER

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                                                  |       |       |      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------------------------------------------------|-------|-------|------|
| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                                                  |       |       |      |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                                                  |       |       |      |
| <b>Course ID:</b> ÚGE/<br>EUG1/10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      | <b>Course name:</b> Regional geography of Europe |       |       |      |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 3 <b>Per study period:</b> 42<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |                                                  |       |       |      |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                                                  |       |       |      |
| <b>Recommended semester/trimester of the course:</b> 4., 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                                                  |       |       |      |
| <b>Course level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                                                  |       |       |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                                                  |       |       |      |
| <b>Conditions for course completion:</b><br>test plus oral examination                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |                                                  |       |       |      |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                                                  |       |       |      |
| <b>Brief outline of the course:</b><br>Pre-history of Europe, development of population, creation of the first state organisations. Development of political map of Europe from the Middle Ages and to present. National, linguistic and religious development of European population and its present distribution. Economy of different regions of Europe – Northern Europe, Southern Europe, Western Europe, postcommunist countries of Central Europe, and Russia.                                                                                                                                                                                                                                                                                                                                                                 |      |                                                  |       |       |      |
| <b>Recommended literature:</b><br>BLOUET, B. W. 2008: The EU & Neighbours. A Geography of Europe in the Modern World. Wiley & Sons.<br>De BLIJ, H.J., MULLER, P. O. 2008: The World Today. Concepts and Regions in Geography. 3rd edition. Wiley. ISBN 0-470-04681-3<br>GAJDOŠ, A., MAZÚREK, J. 2004: Geografia štátov Európskej únie. 1. časť, Banská Bystrica: Fakulta prírodných vied, 186 s. ISBN 80-8055-997-X<br>GAJDOŠ, A., MAZÚREK, J. 2006: Geografia štátov Európskej únie a ostatných štátov Európy. 2. časť, Banská Bystrica: Fakulta prírodných vied, 159 s. ISBN 80-8083-284-6<br>SKOKAN, L. 2005: Rusko. Geografický prehľad. Ústí nad Labem, 215 s.. ISBN 80-7044-647-1<br>VITURKA, M., ŘEHÁK, S., VANČURA, M. 2004: Regionální geografie Evropy a ČR, Brno: Masarykova univerzita v Brne. 126 s., ISBN 80-210-3504-8 |      |                                                  |       |       |      |
| <b>Course language:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |                                                  |       |       |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                                                  |       |       |      |
| <b>Course assessment</b><br>Total number of assessed students: 153                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                                                  |       |       |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | B    | C                                                | D     | E     | FX   |
| 21.57                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 18.3 | 22.88                                            | 16.99 | 19.61 | 0.65 |

|                                                  |
|--------------------------------------------------|
| <b>Provides:</b> RNDr. Stela Csachová, PhD.      |
| <b>Date of last modification:</b> 03.05.2015     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc. |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                                                      |       |       |      |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                                                      |       |       |      |
| <b>Course ID:</b> ÚGE/<br>GSR2/10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       | <b>Course name:</b> Regional geography of Slovakia (human geography) |       |       |      |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 3 <b>Per study period:</b> 42<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                                      |       |       |      |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                                                      |       |       |      |
| <b>Recommended semester/trimester of the course:</b> 4., 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                                                      |       |       |      |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                                      |       |       |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                                                      |       |       |      |
| <b>Conditions for course completion:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                                                      |       |       |      |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                                                      |       |       |      |
| <b>Brief outline of the course:</b><br>Historical development of the territory of Slovakia, population, its national, linguistic and religious structure at various regional levels, types of urban and rural settlements, administrative division of Slovakia and its historical development, economy of the country - agriculture, industry, transport system, education institutions and tourism in Slovakia.                                                                                                                                                                                                                                                                      |       |                                                                      |       |       |      |
| <b>Recommended literature:</b><br>Dubcová, A. a kol., 2008: Geografia Slovenska. Učebnica geografie pre regionálny rozvoj. 350 p.<br>Lauko, V., Tolmáči, L., Dubcová, A., 2006: Humánna geografia Slovenskej republiky, Kartprint Bratislava, 200 p.<br>Matlovič, R., 1996: Vybrané kapitoly z regionálnej geografie Slovenskej republiky, Obyvateľstvo a sídla. Metodické centrum, Prešov, 81 p.<br>Michaeli, E., 1996: Vybrané kapitoly z regionálnej geografie Slovenskej republiky, Cestovný ruch. Metodické centrum, Prešov, 65 p.<br>Michaeli, E. 1996: Vybrané kapitoly z regionálnej geografie Slovenskej republiky, Priemysel, poľnohospodárstvo. Metodické centrum, Prešov. |       |                                                                      |       |       |      |
| <b>Course language:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                                      |       |       |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                                                      |       |       |      |
| <b>Course assessment</b><br>Total number of assessed students: 161                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                                                      |       |       |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | B     | C                                                                    | D     | E     | FX   |
| 8.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 15.53 | 30.43                                                                | 21.74 | 22.36 | 1.24 |
| <b>Provides:</b> RNDr. Janetta Nestorová-Dická, PhD., Mgr. Marián Kulla, PhD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                                                      |       |       |      |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                                                      |       |       |      |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                                                      |       |       |      |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                     |                                              |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                        |                                              |
| <b>Course ID:</b> ÚTVŠ/<br>ÚTVŠ/CM/13                                                                                                                                                                     | <b>Course name:</b> Seaside Aerobic Exercise |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 36 <b>Per study period:</b> 504<br><b>Course method:</b> present |                                              |
| <b>Number of credits:</b> 2                                                                                                                                                                               |                                              |
| <b>Recommended semester/trimester of the course:</b>                                                                                                                                                      |                                              |
| <b>Course level:</b> I., II.                                                                                                                                                                              |                                              |
| <b>Prerequisites:</b>                                                                                                                                                                                     |                                              |
| <b>Conditions for course completion:</b>                                                                                                                                                                  |                                              |
| <b>Learning outcomes:</b>                                                                                                                                                                                 |                                              |
| <b>Brief outline of the course:</b>                                                                                                                                                                       |                                              |
| <b>Recommended literature:</b>                                                                                                                                                                            |                                              |
| <b>Course language:</b>                                                                                                                                                                                   |                                              |
| <b>Notes:</b>                                                                                                                                                                                             |                                              |
| <b>Course assessment</b><br>Total number of assessed students: 7                                                                                                                                          |                                              |
| abs                                                                                                                                                                                                       | n                                            |
| 57.14                                                                                                                                                                                                     | 42.86                                        |
| <b>Provides:</b> Mgr. Alena Buková, PhD., Mgr. Agata Horbacz, PhD.                                                                                                                                        |                                              |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                              |                                              |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                          |                                              |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                   |     |                                                  |     |     |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                      |     |                                                  |     |     |     |
| <b>Course ID:</b> ÚFV/SEA1/04                                                                                                                                                                           |     | <b>Course name:</b> Seminar from Nuclear Physics |     |     |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 1 <b>Per study period:</b> 14<br><b>Course method:</b> present |     |                                                  |     |     |     |
| <b>Number of credits:</b> 1                                                                                                                                                                             |     |                                                  |     |     |     |
| <b>Recommended semester/trimester of the course:</b> 6.                                                                                                                                                 |     |                                                  |     |     |     |
| <b>Course level:</b> I.                                                                                                                                                                                 |     |                                                  |     |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                   |     |                                                  |     |     |     |
| <b>Conditions for course completion:</b>                                                                                                                                                                |     |                                                  |     |     |     |
| <b>Learning outcomes:</b><br>To bring the topical problems, methodics and tools of high energy physics to the students.                                                                                 |     |                                                  |     |     |     |
| <b>Brief outline of the course:</b><br>Department seminar - selected topical problems of the nuclear and subnuclear physics.                                                                            |     |                                                  |     |     |     |
| <b>Recommended literature:</b>                                                                                                                                                                          |     |                                                  |     |     |     |
| <b>Course language:</b>                                                                                                                                                                                 |     |                                                  |     |     |     |
| <b>Notes:</b>                                                                                                                                                                                           |     |                                                  |     |     |     |
| <b>Course assessment</b><br>Total number of assessed students: 12                                                                                                                                       |     |                                                  |     |     |     |
| A                                                                                                                                                                                                       | B   | C                                                | D   | E   | FX  |
| 100.0                                                                                                                                                                                                   | 0.0 | 0.0                                              | 0.0 | 0.0 | 0.0 |
| <b>Provides:</b> doc. RNDr. Jozef Urbán, CSc.                                                                                                                                                           |     |                                                  |     |     |     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                            |     |                                                  |     |     |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                        |     |                                                  |     |     |     |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                             |       |                                                  |      |      |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                |       |                                                  |      |      |     |
| <b>Course ID:</b> ÚFV/TRS/03                                                                                                                                                                                                                                                                                                                                                                                                      |       | <b>Course name:</b> Special Theory of Relativity |      |      |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 <b>Per study period:</b> 28<br><b>Course method:</b> present                                                                                                                                                                                                                            |       |                                                  |      |      |     |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                                  |      |      |     |
| <b>Recommended semester/trimester of the course:</b> 5.                                                                                                                                                                                                                                                                                                                                                                           |       |                                                  |      |      |     |
| <b>Course level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                                  |      |      |     |
| <b>Prerequisites:</b> ÚFV/TEP1/03                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                                  |      |      |     |
| <b>Conditions for course completion:</b><br>Final examination                                                                                                                                                                                                                                                                                                                                                                     |       |                                                  |      |      |     |
| <b>Learning outcomes:</b><br>To acquaint students with principles of a special theory of relativity.                                                                                                                                                                                                                                                                                                                              |       |                                                  |      |      |     |
| <b>Brief outline of the course:</b><br>Galilean transformation and Galilean principle of relativity. Ether's hypothesis. Michelson experiment. Einstein's principles of the special theory of relativity. Lorentz transformation and its physical consequences. Interval and light cone. Proper time. Minkowski's space-time. Mathematical apparatus of special relativity. Relativistic electrodynamics. Relativistic mechanics. |       |                                                  |      |      |     |
| <b>Recommended literature:</b><br>1. Greiner W.: Classical Mechanics-Point Particles and Relativity, Springer-Verlag, New York, 2004.<br>2. Goldstein H., Poole Ch., Safko J.: Classical Mechanics, Addison Wesley, San Francisco, 2002.<br>3. Landau L.D., Lifšic E.M.: The Classical Theory of Fields, Pergamon Press, Oxford, 1975.                                                                                            |       |                                                  |      |      |     |
| <b>Course language:</b><br>1. Slovak,<br>2. English                                                                                                                                                                                                                                                                                                                                                                               |       |                                                  |      |      |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                                  |      |      |     |
| <b>Course assessment</b><br>Total number of assessed students: 159                                                                                                                                                                                                                                                                                                                                                                |       |                                                  |      |      |     |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                 | B     | C                                                | D    | E    | FX  |
| 52.2                                                                                                                                                                                                                                                                                                                                                                                                                              | 22.64 | 13.84                                            | 6.29 | 5.03 | 0.0 |
| <b>Provides:</b> prof. RNDr. Andrej Bobák, DrSc.                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                  |      |      |     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                                                                      |       |                                                  |      |      |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                  |      |      |     |

## COURSE INFORMATION LETTER

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-------|
| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                  |                                          |       |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                     |                                          |       |
| <b>Course ID:</b> ÚTVŠ/<br>TVa/11                                                                                                                                                                                                                                                                                                                                      | <b>Course name:</b> Sports Activities I. |       |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 <b>Per study period:</b> 28<br><b>Course method:</b> present                                                                                                                                                                |                                          |       |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                            |                                          |       |
| <b>Recommended semester/trimester of the course:</b> 1.                                                                                                                                                                                                                                                                                                                |                                          |       |
| <b>Course level:</b> I., I.II., II.                                                                                                                                                                                                                                                                                                                                    |                                          |       |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                  |                                          |       |
| <b>Conditions for course completion:</b>                                                                                                                                                                                                                                                                                                                               |                                          |       |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                                                                                              |                                          |       |
| <b>Brief outline of the course:</b>                                                                                                                                                                                                                                                                                                                                    |                                          |       |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                                                                                         |                                          |       |
| <b>Course language:</b>                                                                                                                                                                                                                                                                                                                                                |                                          |       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                          |                                          |       |
| <b>Course assessment</b><br>Total number of assessed students: 7947                                                                                                                                                                                                                                                                                                    |                                          |       |
| abs                                                                                                                                                                                                                                                                                                                                                                    | n                                        | neabs |
| 87.96                                                                                                                                                                                                                                                                                                                                                                  | 8.12                                     | 3.93  |
| <b>Provides:</b> PaedDr. Imrich Staško, doc. PhDr. Ivan Šulc, CSc., doc. Mgr. Rastislav Feč, PhD., Mgr. Ivan Matúš, PhD., Mgr. Zuzana Küchelová, Mgr. Peter Bakalár, PhD., doc. PaedDr. Ivan Uher, PhD., PaedDr. Milena Švedová, PhD., Mgr. Agata Horbacz, PhD., Mgr. Marek Valanský, prof. RNDr. Stanislav Vokál, DrSc., Mgr. Lucia Kršňáková, PhD., Mgr. Dávid Kaško |                                          |       |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                           |                                          |       |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                                                                                       |                                          |       |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                    |                                           |       |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                       |                                           |       |
| <b>Course ID:</b> ÚTVŠ/<br>TVb/11                                                                                                                                                                                                                                                                                                                                                                                        | <b>Course name:</b> Sports Activities II. |       |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 <b>Per study period:</b> 28<br><b>Course method:</b> present                                                                                                                                                                                                                  |                                           |       |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                              |                                           |       |
| <b>Recommended semester/trimester of the course:</b> 2.                                                                                                                                                                                                                                                                                                                                                                  |                                           |       |
| <b>Course level:</b> I., I.II., II.                                                                                                                                                                                                                                                                                                                                                                                      |                                           |       |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                    |                                           |       |
| <b>Conditions for course completion:</b>                                                                                                                                                                                                                                                                                                                                                                                 |                                           |       |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                                                                                                                                                |                                           |       |
| <b>Brief outline of the course:</b>                                                                                                                                                                                                                                                                                                                                                                                      |                                           |       |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                                                                                                                                           |                                           |       |
| <b>Course language:</b>                                                                                                                                                                                                                                                                                                                                                                                                  |                                           |       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                            |                                           |       |
| <b>Course assessment</b><br>Total number of assessed students: 7437                                                                                                                                                                                                                                                                                                                                                      |                                           |       |
| abs                                                                                                                                                                                                                                                                                                                                                                                                                      | n                                         | neabs |
| 85.03                                                                                                                                                                                                                                                                                                                                                                                                                    | 10.93                                     | 4.03  |
| <b>Provides:</b> PaedDr. Imrich Staško, doc. Mgr. Rastislav Feč, PhD., doc. PhDr. Ivan Šulc, CSc., Mgr. Ivan Matúš, PhD., Mgr. Zuzana Küchelová, doc. PaedDr. Ivan Uher, PhD., Mgr. Peter Bakalár, PhD., PaedDr. Milena Švedová, PhD., Mgr. Agata Horbacz, PhD., Mgr. Marek Valanský, prof. RNDr. Stanislav Vokál, DrSc., Mgr. Lucia Kršňáková, PhD., Mgr. Dávid Kaško, Mgr. Aurel Zelko, PhD., Mgr. Dana Dračková, PhD. |                                           |       |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                                                             |                                           |       |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                                                                                                                                         |                                           |       |

## COURSE INFORMATION LETTER

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-------|
| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                           |                                            |       |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                              |                                            |       |
| <b>Course ID:</b> ÚTVŠ/<br>TVc/11                                                                                                                                                                                                                                                                                                                                               | <b>Course name:</b> Sports Activities III. |       |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 <b>Per study period:</b> 28<br><b>Course method:</b> present                                                                                                                                                                         |                                            |       |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                     |                                            |       |
| <b>Recommended semester/trimester of the course:</b> 3.                                                                                                                                                                                                                                                                                                                         |                                            |       |
| <b>Course level:</b> I., I.II., II.                                                                                                                                                                                                                                                                                                                                             |                                            |       |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                           |                                            |       |
| <b>Conditions for course completion:</b>                                                                                                                                                                                                                                                                                                                                        |                                            |       |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                                                                                                       |                                            |       |
| <b>Brief outline of the course:</b>                                                                                                                                                                                                                                                                                                                                             |                                            |       |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                                                                                                  |                                            |       |
| <b>Course language:</b>                                                                                                                                                                                                                                                                                                                                                         |                                            |       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                   |                                            |       |
| <b>Course assessment</b><br>Total number of assessed students: 4650                                                                                                                                                                                                                                                                                                             |                                            |       |
| abs                                                                                                                                                                                                                                                                                                                                                                             | n                                          | neabs |
| 89.63                                                                                                                                                                                                                                                                                                                                                                           | 4.71                                       | 5.66  |
| <b>Provides:</b> PaedDr. Imrich Staško, doc. Mgr. Rastislav Feč, PhD., doc. PhDr. Ivan Šulc, CSc.,<br>Mgr. Ivan Matúš, PhD., Mgr. Zuzana Küchelová, doc. PaedDr. Ivan Uher, PhD., PaedDr. Milena<br>Švedová, PhD., Mgr. Peter Bakalár, PhD., Mgr. Agata Horbacz, PhD., Mgr. Marek Valanský, prof.<br>RNDr. Stanislav Vokál, DrSc., Mgr. Lucia Kršňáková, PhD., Mgr. Dávid Kaško |                                            |       |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                    |                                            |       |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                                                                                                |                                            |       |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                    |                                           |       |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                       |                                           |       |
| <b>Course ID:</b> ÚTVŠ/<br>TVd/11                                                                                                                                                                                                                                                                                                                                                                                        | <b>Course name:</b> Sports Activities IV. |       |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 <b>Per study period:</b> 28<br><b>Course method:</b> present                                                                                                                                                                                                                  |                                           |       |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                              |                                           |       |
| <b>Recommended semester/trimester of the course:</b> 4.                                                                                                                                                                                                                                                                                                                                                                  |                                           |       |
| <b>Course level:</b> I., I.II., II.                                                                                                                                                                                                                                                                                                                                                                                      |                                           |       |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                    |                                           |       |
| <b>Conditions for course completion:</b>                                                                                                                                                                                                                                                                                                                                                                                 |                                           |       |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                                                                                                                                                |                                           |       |
| <b>Brief outline of the course:</b>                                                                                                                                                                                                                                                                                                                                                                                      |                                           |       |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                                                                                                                                           |                                           |       |
| <b>Course language:</b>                                                                                                                                                                                                                                                                                                                                                                                                  |                                           |       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                            |                                           |       |
| <b>Course assessment</b><br>Total number of assessed students: 3884                                                                                                                                                                                                                                                                                                                                                      |                                           |       |
| abs                                                                                                                                                                                                                                                                                                                                                                                                                      | n                                         | neabs |
| 85.79                                                                                                                                                                                                                                                                                                                                                                                                                    | 6.77                                      | 7.44  |
| <b>Provides:</b> PaedDr. Imrich Staško, doc. Mgr. Rastislav Feč, PhD., doc. PhDr. Ivan Šulc, CSc., Mgr. Ivan Matúš, PhD., Mgr. Zuzana Küchelová, PaedDr. Milena Švedová, PhD., Mgr. Peter Bakalár, PhD., doc. PaedDr. Ivan Uher, PhD., Mgr. Agata Horbacz, PhD., Mgr. Marek Valanský, prof. RNDr. Stanislav Vokál, DrSc., Mgr. Lucia Kršňáková, PhD., Mgr. Dávid Kaško, Mgr. Aurel Zelko, PhD., Mgr. Dana Dračková, PhD. |                                           |       |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                                                             |                                           |       |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                                                                                                                                         |                                           |       |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                          |      |                                                          |      |       |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                             |      |                                                          |      |       |     |
| <b>Course ID:</b> ÚFV/<br>MSU/07                                                                                                                                                                                                                                                                                                               |      | <b>Course name:</b> Statistical Methods of Data Analysis |      |       |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14<br><b>Course method:</b> present                                                                                                                     |      |                                                          |      |       |     |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                                                                                    |      |                                                          |      |       |     |
| <b>Recommended semester/trimester of the course:</b> 5.                                                                                                                                                                                                                                                                                        |      |                                                          |      |       |     |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                        |      |                                                          |      |       |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                          |      |                                                          |      |       |     |
| <b>Conditions for course completion:</b><br>Exam                                                                                                                                                                                                                                                                                               |      |                                                          |      |       |     |
| <b>Learning outcomes:</b><br>Introduction to probability theory and mathematical statistics.                                                                                                                                                                                                                                                   |      |                                                          |      |       |     |
| <b>Brief outline of the course:</b><br>General introduction to theory of probability, random processes and mathematical statistics.                                                                                                                                                                                                            |      |                                                          |      |       |     |
| <b>Recommended literature:</b><br>1) L. Lyons, Statistics for Nuclear and Particle Physics, CUP, 1989.<br>2) L. Lyons, A Practical Guide to Data Analysis for Physical Science Students, CUP, 1991.<br>3) J.R. Taylor, An Introduction to Error Analysis: The Study of Uncertainties in Physical Measurements, University Science Books, 1997. |      |                                                          |      |       |     |
| <b>Course language:</b>                                                                                                                                                                                                                                                                                                                        |      |                                                          |      |       |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                  |      |                                                          |      |       |     |
| <b>Course assessment</b><br>Total number of assessed students: 32                                                                                                                                                                                                                                                                              |      |                                                          |      |       |     |
| A                                                                                                                                                                                                                                                                                                                                              | B    | C                                                        | D    | E     | FX  |
| 21.88                                                                                                                                                                                                                                                                                                                                          | 9.38 | 12.5                                                     | 3.13 | 53.13 | 0.0 |
| <b>Provides:</b> doc. RNDr. Jozef Urbán, CSc., RNDr. Adela Kravčáková, PhD.                                                                                                                                                                                                                                                                    |      |                                                          |      |       |     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                   |      |                                                          |      |       |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                                                               |      |                                                          |      |       |     |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                               |       |                                                             |       |       |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                  |       |                                                             |       |       |     |
| <b>Course ID:</b> ÚFV/SEV/10                                                                                                                                                                                                                                                                                                                                                        |       | <b>Course name:</b> Structure and Evolution of the Universe |       |       |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 2 <b>Per study period:</b> 28<br><b>Course method:</b> present                                                                                                                                                                              |       |                                                             |       |       |     |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                         |       |                                                             |       |       |     |
| <b>Recommended semester/trimester of the course:</b> 4.                                                                                                                                                                                                                                                                                                                             |       |                                                             |       |       |     |
| <b>Course level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                        |       |                                                             |       |       |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                               |       |                                                             |       |       |     |
| <b>Conditions for course completion:</b><br>Test; seminar paper.<br>Oral exam with preparation; 3 questions within the curriculum presented during the course.                                                                                                                                                                                                                      |       |                                                             |       |       |     |
| <b>Learning outcomes:</b><br>Become acquainted with basic knowledge about the structure and evolution of the universe.                                                                                                                                                                                                                                                              |       |                                                             |       |       |     |
| <b>Brief outline of the course:</b><br>The stars, their basic properties, structure and evolution. Structure and distribution of matter in the universe. Cosmological theories, formation, evolution and future of the universe.                                                                                                                                                    |       |                                                             |       |       |     |
| <b>Recommended literature:</b><br>1. Carroll, B. W., Ostlie, D. A., An Introduction to Modern Astrophysics, Addison-Wesley Publishing Company, Reading, Massachusetts, 1996.<br>2. Contopoulos, D. Kotsakis, Cosmology, the structure and evolution of the Universe, Springer, 1984<br>3. Narlikar, J.V., An Introduction to Cosmology, Cambridge University Press, Cambridge, 2002 |       |                                                             |       |       |     |
| <b>Course language:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                          |       |                                                             |       |       |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                       |       |                                                             |       |       |     |
| <b>Course assessment</b><br>Total number of assessed students: 104                                                                                                                                                                                                                                                                                                                  |       |                                                             |       |       |     |
| A                                                                                                                                                                                                                                                                                                                                                                                   | B     | C                                                           | D     | E     | FX  |
| 24.04                                                                                                                                                                                                                                                                                                                                                                               | 33.65 | 15.38                                                       | 15.38 | 11.54 | 0.0 |
| <b>Provides:</b> doc. RNDr. Rudolf Gális, PhD.                                                                                                                                                                                                                                                                                                                                      |       |                                                             |       |       |     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                        |       |                                                             |       |       |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                                                                                                    |       |                                                             |       |       |     |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                        |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                        |
| <b>Course ID:</b> ÚFV/<br>SVL1/03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Course name:</b> Structure and Properties of Solids |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 3 <b>Per study period:</b> 42<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                        |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                        |
| <b>Recommended semester/trimester of the course:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                        |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                        |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                        |
| <b>Conditions for course completion:</b><br>50% maintained output, written test<br>50% final exam                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                        |
| <b>Learning outcomes:</b><br>To explain basic problems of Solid State physics. The course is mainly oriented on fundamental type of lattices, symmetry and crystal structure, X-ray diffractometry, Thermal properties, mechanical properties and conductivity of solids. The course allows to continue education in specialized topics of Condensed Matter like: Magnetic properties, Low temperature physics, Experimental methods of CM, Semiconductors etc.                                                                                                                                                                                                                                         |                                                        |
| <b>Brief outline of the course:</b><br>Periodic array of atoms. Fundamental type of lattices. Index systems for crystal planes. Simple crystal structure. Symmetry and crystal structure. Point and space groups. Crystal binding and elastic constants. Wave diffraction and the reciprocal lattice. X-ray diffractometry. Bragg's law, Laue conditions, scattering of x-rays, Neutrons and neutron scattering, CW - diffractometer, Ewald's sphere, Diffraction on powder samples, Structure factor, Occupation factor, Atomic displacement factor. Thermal properties. Phonon heat capacity, thermal conductivity. Free electron Fermi gas. Energy bands. Semiconductor crystals. Superconductivity. |                                                        |
| <b>Recommended literature:</b><br>1. Ch. Kittel, Solid State Physics, Springer, 1985.<br>3. Fundamentals of Powder Diffraction and Structural Characterization of Materials, Vitalij K. Pecharsky & Peter Y. Zavalij, Kluwer Academic Publishers, 2003.<br>4. Structure Determination from Powder Diffraction Data, Edited by W.I.F. David, K. Shankland, L.B. McCusker, C. Bärlocher, Oxford University Press, 2006                                                                                                                                                                                                                                                                                    |                                                        |
| <b>Course language:</b><br>english                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                        |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                        |

|                                                  |       |       |       |     |     |
|--------------------------------------------------|-------|-------|-------|-----|-----|
| <b>Course assessment</b>                         |       |       |       |     |     |
| Total number of assessed students: 37            |       |       |       |     |     |
| A                                                | B     | C     | D     | E   | FX  |
| 45.95                                            | 18.92 | 16.22 | 13.51 | 2.7 | 2.7 |
| <b>Provides:</b> prof. RNDr. Pavol Sovák, CSc.   |       |       |       |     |     |
| <b>Date of last modification:</b> 03.05.2015     |       |       |       |     |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc. |       |       |       |     |     |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                              |     |                                                   |     |     |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                 |     |                                                   |     |     |     |
| <b>Course ID:</b> ÚFV/<br>SVK/13                                                                                                                                                   |     | <b>Course name:</b> Student Scientific Conference |     |     |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b><br><b>Recommended course-load (hours):</b><br><b>Per week: Per study period:</b><br><b>Course method:</b> present |     |                                                   |     |     |     |
| <b>Number of credits:</b> 4                                                                                                                                                        |     |                                                   |     |     |     |
| <b>Recommended semester/trimester of the course:</b>                                                                                                                               |     |                                                   |     |     |     |
| <b>Course level:</b> I., II.                                                                                                                                                       |     |                                                   |     |     |     |
| <b>Prerequisites:</b>                                                                                                                                                              |     |                                                   |     |     |     |
| <b>Conditions for course completion:</b>                                                                                                                                           |     |                                                   |     |     |     |
| <b>Learning outcomes:</b>                                                                                                                                                          |     |                                                   |     |     |     |
| <b>Brief outline of the course:</b>                                                                                                                                                |     |                                                   |     |     |     |
| <b>Recommended literature:</b>                                                                                                                                                     |     |                                                   |     |     |     |
| <b>Course language:</b>                                                                                                                                                            |     |                                                   |     |     |     |
| <b>Notes:</b>                                                                                                                                                                      |     |                                                   |     |     |     |
| <b>Course assessment</b><br>Total number of assessed students: 19                                                                                                                  |     |                                                   |     |     |     |
| A                                                                                                                                                                                  | B   | C                                                 | D   | E   | FX  |
| 100.0                                                                                                                                                                              | 0.0 | 0.0                                               | 0.0 | 0.0 | 0.0 |
| <b>Provides:</b>                                                                                                                                                                   |     |                                                   |     |     |     |
| <b>Date of last modification:</b>                                                                                                                                                  |     |                                                   |     |     |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                   |     |                                                   |     |     |     |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                     |                                                         |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                        |                                                         |
| <b>Course ID:</b> ÚTVŠ/<br>LKSp//13                                                                                                                                                                       | <b>Course name:</b> Summer Course-Rafting of TISA River |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 36 <b>Per study period:</b> 504<br><b>Course method:</b> present |                                                         |
| <b>Number of credits:</b> 2                                                                                                                                                                               |                                                         |
| <b>Recommended semester/trimester of the course:</b>                                                                                                                                                      |                                                         |
| <b>Course level:</b> I., II.                                                                                                                                                                              |                                                         |
| <b>Prerequisites:</b>                                                                                                                                                                                     |                                                         |
| <b>Conditions for course completion:</b>                                                                                                                                                                  |                                                         |
| <b>Learning outcomes:</b>                                                                                                                                                                                 |                                                         |
| <b>Brief outline of the course:</b>                                                                                                                                                                       |                                                         |
| <b>Recommended literature:</b>                                                                                                                                                                            |                                                         |
| <b>Course language:</b>                                                                                                                                                                                   |                                                         |
| <b>Notes:</b>                                                                                                                                                                                             |                                                         |
| <b>Course assessment</b><br>Total number of assessed students: 92                                                                                                                                         |                                                         |
| abs                                                                                                                                                                                                       | n                                                       |
| 35.87                                                                                                                                                                                                     | 64.13                                                   |
| <b>Provides:</b> Mgr. Peter Bakalár, PhD.                                                                                                                                                                 |                                                         |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                              |                                                         |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                          |                                                         |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                     |                                     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                        |                                     |
| <b>Course ID:</b> ÚTVŠ/<br>KP/12                                                                                                                                                                          | <b>Course name:</b> Survival Course |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 36 <b>Per study period:</b> 504<br><b>Course method:</b> present |                                     |
| <b>Number of credits:</b> 2                                                                                                                                                                               |                                     |
| <b>Recommended semester/trimester of the course:</b>                                                                                                                                                      |                                     |
| <b>Course level:</b> I., II.                                                                                                                                                                              |                                     |
| <b>Prerequisites:</b>                                                                                                                                                                                     |                                     |
| <b>Conditions for course completion:</b>                                                                                                                                                                  |                                     |
| <b>Learning outcomes:</b>                                                                                                                                                                                 |                                     |
| <b>Brief outline of the course:</b>                                                                                                                                                                       |                                     |
| <b>Recommended literature:</b>                                                                                                                                                                            |                                     |
| <b>Course language:</b>                                                                                                                                                                                   |                                     |
| <b>Notes:</b>                                                                                                                                                                                             |                                     |
| <b>Course assessment</b><br>Total number of assessed students: 251                                                                                                                                        |                                     |
| abs                                                                                                                                                                                                       | n                                   |
| 43.82                                                                                                                                                                                                     | 56.18                               |
| <b>Provides:</b> Mgr. Marek Valanský, MUDr. Peter Dombrovský                                                                                                                                              |                                     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                              |                                     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                          |                                     |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |                                           |       |      |       |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |                                           |       |      |       |
| <b>Course ID:</b> ÚFV/TME1/03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      | <b>Course name:</b> Theoretical Mechanics |       |      |       |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 3 / 2 <b>Per study period:</b> 42 / 28<br><b>Course method:</b> present                                                                                                                                                                                                                                                                                       |      |                                           |       |      |       |
| <b>Number of credits:</b> 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |                                           |       |      |       |
| <b>Recommended semester/trimester of the course:</b> 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                                           |       |      |       |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                                           |       |      |       |
| <b>Prerequisites:</b> ÚFV/VF1a/12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |                                           |       |      |       |
| <b>Conditions for course completion:</b><br>Two tests to deal with specific tasks mechanics.<br>Examination.                                                                                                                                                                                                                                                                                                                                                                                                     |      |                                           |       |      |       |
| <b>Learning outcomes:</b><br>To acquaint students with principles of the theoretical mechanics.                                                                                                                                                                                                                                                                                                                                                                                                                  |      |                                           |       |      |       |
| <b>Brief outline of the course:</b><br>Mechanics of systems with constraints. Principle of virtual work and d'Alembert's principle. Lagrange's equations of motion. Hamilton's principle. Hamilton's equations. Kinematics and dynamics of rigid bodies. Euler's equations. Continuum mechanics. Deformation and stress tensors. General form of Hooke's law. Equilibrium of fluids. Motion of ideal and viscous fluids.                                                                                         |      |                                           |       |      |       |
| <b>Recommended literature:</b><br>1. Meirovitch L.: Methods of Analytical dynamics, McGraw-Hill, New York, 1970.<br>2. Taylor T.T.: Mechanics: Classical and Quantum, Pergamon Press, Oxford, 1976.<br>3. Strelkov S.P.: Mechanics, Mir Publishers, Moscow, 1985.<br>4. Greiner W.: Classical Mechanics, Springer-Verlag, Berlin, 2010.<br>5. Goldstein H.: Classical Mechanics, Addison-Wesley, London, 1970.<br>6. Barger V., Olsson M.: Classical Mechanics: A Modern Perspective, McGraw-Hill, London, 1973. |      |                                           |       |      |       |
| <b>Course language:</b><br>1. Slovak,<br>2. English                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |                                           |       |      |       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                                           |       |      |       |
| <b>Course assessment</b><br>Total number of assessed students: 140                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |                                           |       |      |       |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | B    | C                                         | D     | E    | FX    |
| 32.86                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 15.0 | 16.43                                     | 16.43 | 8.57 | 10.71 |
| <b>Provides:</b> prof. RNDr. Andrej Bobák, DrSc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                                           |       |      |       |

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|--------------------------------------------------|
| <b>Date of last modification:</b> 03.05.2015     |
| <b>Approved:</b> prof. RNDr. Michal Jašcur, CSc. |

## COURSE INFORMATION LETTER

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------------------------------------------------|-------|-------|------|
| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                  |      |                                                         |       |       |      |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                     |      |                                                         |       |       |      |
| <b>Course ID:</b> ÚFV/TEP1/03                                                                                                                                                                                                                                                                          |      | <b>Course name:</b> Theory of the Electromagnetic Field |       |       |      |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 3 / 1 <b>Per study period:</b> 42 / 14<br><b>Course method:</b> present                                                                             |      |                                                         |       |       |      |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                            |      |                                                         |       |       |      |
| <b>Recommended semester/trimester of the course:</b> 4.                                                                                                                                                                                                                                                |      |                                                         |       |       |      |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                |      |                                                         |       |       |      |
| <b>Prerequisites:</b> ÚFV/VFM1b/15 or ÚFV/VF1b/03                                                                                                                                                                                                                                                      |      |                                                         |       |       |      |
| <b>Conditions for course completion:</b><br>Two tests to deal with specific tasks theory of the electromagnetic field.<br>Examination.                                                                                                                                                                 |      |                                                         |       |       |      |
| <b>Learning outcomes:</b><br>To acquaint students with principles of a theory of the electromagnetic field.                                                                                                                                                                                            |      |                                                         |       |       |      |
| <b>Brief outline of the course:</b><br>Maxwell equations in vacuum. Scalar and vector potentials. Conservation laws. Electrostatic field. Static magnetic field. Maxwell equations in macroscopic media. Quasistatic electromagnetic field. Electromagnetic waves. Radiation of electromagnetic waves. |      |                                                         |       |       |      |
| <b>Recommended literature:</b><br>1. Jackson J.D.: Classical Electrodynamics, John Wiley, New York, 1975.<br>2. Rao N.N.: Basic Electromagnetics with Applications, Prentice-Hall, New Jersey, 1972.<br>3. Greiner W.: Classical Electrodynamics, Springer-Verlag, New York, 1998.                     |      |                                                         |       |       |      |
| <b>Course language:</b><br>1. Slovak,<br>2. English                                                                                                                                                                                                                                                    |      |                                                         |       |       |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                          |      |                                                         |       |       |      |
| <b>Course assessment</b><br>Total number of assessed students: 248                                                                                                                                                                                                                                     |      |                                                         |       |       |      |
| A                                                                                                                                                                                                                                                                                                      | B    | C                                                       | D     | E     | FX   |
| 27.02                                                                                                                                                                                                                                                                                                  | 8.06 | 17.74                                                   | 23.39 | 15.73 | 8.06 |
| <b>Provides:</b> prof. RNDr. Andrej Bobák, DrSc., RNDr. Tomáš Lučivjanský, PhD.                                                                                                                                                                                                                        |      |                                                         |       |       |      |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                           |      |                                                         |       |       |      |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                       |      |                                                         |       |       |      |

## COURSE INFORMATION LETTER

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------------------------------------------|------|------|-----|
| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                                                                                                                                                                                                                        |       |                                                            |      |      |     |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                           |       |                                                            |      |      |     |
| <b>Course ID:</b> ÚFV/<br>TDF1/99                                                                                                                                                                                                                                                                                                                                                                            |       | <b>Course name:</b> Thermodynamics and Statistical Physics |      |      |     |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Lecture / Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 4 / 2 <b>Per study period:</b> 56 / 28<br><b>Course method:</b> present                                                                                                                                                                                   |       |                                                            |      |      |     |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                            |      |      |     |
| <b>Recommended semester/trimester of the course:</b> 6.                                                                                                                                                                                                                                                                                                                                                      |       |                                                            |      |      |     |
| <b>Course level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                      |       |                                                            |      |      |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                        |       |                                                            |      |      |     |
| <b>Conditions for course completion:</b>                                                                                                                                                                                                                                                                                                                                                                     |       |                                                            |      |      |     |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                                                                                                                                    |       |                                                            |      |      |     |
| <b>Brief outline of the course:</b><br>State parameters. Empirical temperature. The principles of thermodynamics.<br>Absolute temperature and entropy. Phase space. Liouville theorem. Density matrix. Statistical ensembles. Bose and Fermi gases.<br>Literature: P.T. Landsberg, Thermodynamics, Interscience, 1961.<br>L.D. Landau, and E.M. Lifshitz, Statistical physics, Pergamon Press, Oxford, 1977. |       |                                                            |      |      |     |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                                                                                                                               |       |                                                            |      |      |     |
| <b>Course language:</b>                                                                                                                                                                                                                                                                                                                                                                                      |       |                                                            |      |      |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                |       |                                                            |      |      |     |
| <b>Course assessment</b><br>Total number of assessed students: 131                                                                                                                                                                                                                                                                                                                                           |       |                                                            |      |      |     |
| A                                                                                                                                                                                                                                                                                                                                                                                                            | B     | C                                                          | D    | E    | FX  |
| 56.49                                                                                                                                                                                                                                                                                                                                                                                                        | 16.79 | 20.61                                                      | 3.82 | 2.29 | 0.0 |
| <b>Provides:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                                                                                                                             |       |                                                            |      |      |     |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                                                                                                                                                                                                                                 |       |                                                            |      |      |     |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                                                                                                                                                                                                                             |       |                                                            |      |      |     |

## COURSE INFORMATION LETTER

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| <b>University:</b> P. J. Šafárik University in Košice                                                                                                                                                     |                                                |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                        |                                                |
| <b>Course ID:</b> ÚTVŠ/<br>ZKLS//13                                                                                                                                                                       | <b>Course name:</b> Winter Ski Training Course |
| <b>Course type, scope and the method:</b><br><b>Course type:</b> Practice<br><b>Recommended course-load (hours):</b><br><b>Per week:</b> 36 <b>Per study period:</b> 504<br><b>Course method:</b> present |                                                |
| <b>Number of credits:</b> 2                                                                                                                                                                               |                                                |
| <b>Recommended semester/trimester of the course:</b>                                                                                                                                                      |                                                |
| <b>Course level:</b> I., II.                                                                                                                                                                              |                                                |
| <b>Prerequisites:</b>                                                                                                                                                                                     |                                                |
| <b>Conditions for course completion:</b>                                                                                                                                                                  |                                                |
| <b>Learning outcomes:</b>                                                                                                                                                                                 |                                                |
| <b>Brief outline of the course:</b>                                                                                                                                                                       |                                                |
| <b>Recommended literature:</b>                                                                                                                                                                            |                                                |
| <b>Course language:</b>                                                                                                                                                                                   |                                                |
| <b>Notes:</b>                                                                                                                                                                                             |                                                |
| <b>Course assessment</b><br>Total number of assessed students: 81                                                                                                                                         |                                                |
| abs                                                                                                                                                                                                       | n                                              |
| 32.1                                                                                                                                                                                                      | 67.9                                           |
| <b>Provides:</b> PaedDr. Imrich Staško, doc. PhDr. Ivan Šulc, CSc.                                                                                                                                        |                                                |
| <b>Date of last modification:</b> 03.05.2015                                                                                                                                                              |                                                |
| <b>Approved:</b> prof. RNDr. Michal Jaščur, CSc.                                                                                                                                                          |                                                |