

## Course descriptions

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## COURSE DESCRIPTION

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                  |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                  |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                  |
| <b>Course ID:</b><br>FMFI.KAG/1-FYZ-115/13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Course title:</b><br>Algebra and Geometry (1) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 3 / 1 <b>per level/semester:</b> 39 / 13<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                  |                                                  |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                  |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                  |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                  |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                  |
| <b>Course requirements:</b><br>Continuous assessment: test<br>Examination: written and oral examination<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 20/80                                                                                                                                                                                                                                                                                                               |                                                  |
| <b>Learning outcomes:</b><br>After completing the course the student will master the basic concepts and methods of linear algebra will be able to use them in geometry and physics.                                                                                                                                                                                                                                                                                                                                                       |                                                  |
| <b>Class syllabus:</b><br>Sets and representations, fields and vector spaces, basics of matrix calculus, systems of linear equations, linear subspaces and linear independence, basis and dimension, linear representations, matrix of linear representation, inverse matrices and transition matrices, base change, affine subspaces, determinants.                                                                                                                                                                                      |                                                  |
| <b>Recommended literature:</b><br>Linear Algebra and Geometry: A Journey of Three Dimensions with Overlaps in Related Fields / Pavol Zlatoš. Bratislava: Albert Marenčin, 2011; electronic version available at <a href="http://thales.doa.fmph.uniba.sk/zlatos/la/LAG_A4.pdf">http://thales.doa.fmph.uniba.sk/zlatos/la/LAG_A4.pdf</a><br>We grow linear algebra / Luboš Motl, Miloš Zahradník. Prague: Karolinum, 2002<br>Lectures on Linear Algebra and Geometry / Július Korbaš, Štefan Gyurki. UK Publishing House, Bratislava, 2013 |                                                  |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                  |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                  |

|                                                                                                      |      |       |       |       |      |
|------------------------------------------------------------------------------------------------------|------|-------|-------|-------|------|
| <b>Past grade distribution</b>                                                                       |      |       |       |       |      |
| Total number of evaluated students: 569                                                              |      |       |       |       |      |
| A                                                                                                    | B    | C     | D     | E     | FX   |
| 14,41                                                                                                | 18,1 | 18,28 | 16,87 | 22,85 | 9,49 |
| <b>Lecturers:</b> prof. RNDr. Pavol Zlatoš, PhD., Mgr. Nina Hronkovičová, PhD., Mgr. Marián Poturnay |      |       |       |       |      |
| <b>Last change:</b> 18.05.2022                                                                       |      |       |       |       |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                    |      |       |       |       |      |

## COURSE DESCRIPTION

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------------------------------------------------|-------|-------|------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                          |       |                                                  |       |       |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                        |       |                                                  |       |       |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                          |       |                                                  |       |       |      |
| <b>Course ID:</b><br>FMFI.KAG/1-FYZ-160/22                                                                                                                                                                                                                                                                                                                                                                               |       | <b>Course title:</b><br>Algebra and Geometry (2) |       |       |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 3 / 1 <b>per level/semester:</b> 39 / 13<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                 |       |                                                  |       |       |      |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                              |       |                                                  |       |       |      |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                          |       |                                                  |       |       |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                             |       |                                                  |       |       |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                                  |       |       |      |
| <b>Course requirements:</b><br>Continuous assessment: test<br>Exam: exam<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 20/80                                                                                                                                                                                                                             |       |                                                  |       |       |      |
| <b>Learning outcomes:</b><br>After completing the course the student will master the most important concepts, results of the method of linear algebra and geometry and will be able to actively use them in other mathematical disciplines and in various fields of physics.                                                                                                                                             |       |                                                  |       |       |      |
| <b>Class syllabus:</b><br>Bilinear and quadratic forms, scalar product, Euclidean and unitary spaces, Minkowski spacetime, eigenvalues and eigenvectors, spectrum of linear operator, Jordan canonical form, self-adjoint and unitary operators, spectral decomposition, principal axis theorem, quadrics.                                                                                                               |       |                                                  |       |       |      |
| <b>Recommended literature:</b><br>Linear Algebra and Geometry: A Journey of Three Dimensions with Overlaps in Related Fields / Pavol Zlatoš. Bratislava: Albert Marenčin, 2011; electronic version available at <a href="http://thales.doa.fmph.uniba.sk/zlatos/la/LAG_A4.pdf">http://thales.doa.fmph.uniba.sk/zlatos/la/LAG_A4.pdf</a><br>We grow linear algebra / Luboš Motl, Miloš Zahradník. Prague: Karolinum, 2002 |       |                                                  |       |       |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                    |       |                                                  |       |       |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                                  |       |       |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 350                                                                                                                                                                                                                                                                                                                                                |       |                                                  |       |       |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                        | B     | C                                                | D     | E     | FX   |
| 20,57                                                                                                                                                                                                                                                                                                                                                                                                                    | 23,43 | 17,71                                            | 20,29 | 13,43 | 4,57 |
| <b>Lecturers:</b> prof. RNDr. Pavol Zlatoš, PhD., Mgr. Nina Hronkovičová, PhD.                                                                                                                                                                                                                                                                                                                                           |       |                                                  |       |       |      |

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|---------------------------------------------------|
| <b>Last change:</b> 18.05.2022                    |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |

## COURSE DESCRIPTION

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------------------------------------------------|------|-----|-----|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                          |      |                                                  |      |     |     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                        |      |                                                  |      |     |     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                          |      |                                                  |      |     |     |
| <b>Course ID:</b><br>FMFI.KAG/1-FYZ-216/22                                                                                                                                                                                                                                                                                                                                                                               |      | <b>Course title:</b><br>Algebra and Geometry (3) |      |     |     |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 1 <b>per level/semester:</b> 26 / 13<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                 |      |                                                  |      |     |     |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                                                                                                                                                              |      |                                                  |      |     |     |
| <b>Recommended semester:</b> 5., 7.                                                                                                                                                                                                                                                                                                                                                                                      |      |                                                  |      |     |     |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                             |      |                                                  |      |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                    |      |                                                  |      |     |     |
| <b>Course requirements:</b><br>Continuous assessment: test 50%<br>Exam: exam 50%<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 50/50                                                                                                                                                                                                                     |      |                                                  |      |     |     |
| <b>Learning outcomes:</b><br>After completing the course the student will know the basic as well as some more advanced concepts, results and methods of group theory, as well as associative and Lie algebras, and will be able to actively use them in the analysis of structural symmetries in geometry, mathematical analysis and physics.                                                                            |      |                                                  |      |     |     |
| <b>Class syllabus:</b><br>Introduction to group theory, Transformation groups, Linear and affine groups, Isometric groups (Euclidean, Lorentz and Poincaré groups), Linear algebras, Lie algebras of matrix groups (continuous components, homotopies, overlapping homomorphisms).                                                                                                                                       |      |                                                  |      |     |     |
| <b>Recommended literature:</b><br>Linear Algebra and Geometry: A Journey of Three Dimensions with Overlaps in Related Fields / Pavol Zlatoš. Bratislava: Albert Marenčin, 2011; electronic version available at <a href="http://thales.doa.fmph.uniba.sk/zlatos/la/LAG_A4.pdf">http://thales.doa.fmph.uniba.sk/zlatos/la/LAG_A4.pdf</a><br>We grow linear algebra / Luboš Motl, Miloš Zahradník. Prague: Karolinum, 2002 |      |                                                  |      |     |     |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                    |      |                                                  |      |     |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                            |      |                                                  |      |     |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 52                                                                                                                                                                                                                                                                                                                                                 |      |                                                  |      |     |     |
| A                                                                                                                                                                                                                                                                                                                                                                                                                        | B    | C                                                | D    | E   | FX  |
| 51,92                                                                                                                                                                                                                                                                                                                                                                                                                    | 25,0 | 13,46                                            | 9,62 | 0,0 | 0,0 |

|                                                   |
|---------------------------------------------------|
| <b>Lecturers:</b> prof. RNDr. Pavol Zlatoš, PhD.  |
| <b>Last change:</b> 18.05.2022                    |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                    |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                    |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                    |
| <b>Course ID:</b><br>FMFI.KAFZM/1-FYZ-421/15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Course title:</b><br>Astronomy and Astrophysics |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 / 2 <b>per level/semester:</b> 52 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                    |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                    |
| <b>Recommended semester:</b> 7.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                    |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                    |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                    |
| <b>Course requirements:</b><br>Continuous Assessment (100%): home assignments 40points, test 60points<br>Approximate scale of final grades: A 91%, B 81%, C 71%, D 61%, E 51%<br>Continuous Assessment / Final Examination: 100/0<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                    |
| <b>Learning outcomes:</b><br>The student will gain basic knowledge of astronomy and astrophysics - the basics of spherical astronomy, celestial mechanics, the planetary system, the formation and evolution of stars, galaxies and galactic systems. After completing the course, students will be sufficiently prepared to continue in the master's degree in astronomy and astrophysics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                    |
| <b>Class syllabus:</b><br>Subject of astronomy; coordinate systems, transformations of coordinate systems; time and calendar, types of time, refraction, aberration, parallax, precession, nutation, self - movement of stars, position reductions, catalogs and yearbooks; two-body problem, equations of motion, Kepler's laws, velocities, anomalies, Kepler's equation, trajectory elements; solar system - structure, geocentric orbits, physical characteristics of solar system bodies - methods of determination, inner planets, Earth-Moon, outer planets, small bodies of the solar system - comets, asteroids, meteorites, meteors, interplanetary dust; formation and development of the solar system. Radiation in astrophysics. Boltzman's equation, Sah's equation. Magnitudes of stars, Pogson's equation, temperature of stars, spectral classification, Herzsprung-Rusell diagram. Binary stars, determination of the mass of stars, rotation of stars, magnetic fields of stars. The relationship between mass and luminosity, determining the dimensions of stars. Variable stars. Interstellar matter - gas, dust, molecules. Galaxy and galaxy. |                                                    |
| <b>Recommended literature:</b><br>An introduction to the Sun and Stars / S. Jocelyn Bell Burnell ... [et al.]. Cambridge: Cambridge University Press, 2004<br>An introduction to the solar system / Philip A. Bland ... [et al.]. Cambridge: Open university, 2004                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                    |

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|----------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|------|------|------|
| Fundamentals of Astronomy and Astrophysics / Vladimír Vanýsek. Prague: Academia, 1980<br>Solar System Physics / M.Brož, M. Šolc. Matfyzpress, 2013 |       |       |      |      |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                              |       |       |      |      |      |
| <b>Notes:</b>                                                                                                                                      |       |       |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 73                                                                           |       |       |      |      |      |
| A                                                                                                                                                  | B     | C     | D    | E    | FX   |
| 53,42                                                                                                                                              | 16,44 | 12,33 | 5,48 | 5,48 | 6,85 |
| <b>Lecturers:</b> prof. RNDr. Juraj Tóth, PhD., RNDr. Roman Nagy, PhD., doc. RNDr. Leonard Kornoš, PhD.                                            |       |       |      |      |      |
| <b>Last change:</b> 20.06.2022                                                                                                                     |       |       |      |      |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                  |       |       |      |      |      |

## STATE EXAM DESCRIPTION

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                             |                                            |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                           |                                            |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                             |                                            |
| <b>Course ID:</b><br>FMFI.KJFB/1-FYZ-991/22                                                                                                                                                                 | <b>Course title:</b><br>BSc Thesis Defence |
| <b>Number of credits:</b> 8                                                                                                                                                                                 |                                            |
| <b>Educational level:</b> I.                                                                                                                                                                                |                                            |
| <b>Course requirements:</b><br>Continuous assessment: According to the progress of the bachelor thesis project based on the assessment of the supervisor.<br>Scale of assessment (preliminary/final): 100/0 |                                            |
| <b>Learning outcomes:</b><br>Elaboration of bachelor thesis and its defense.                                                                                                                                |                                            |
| <b>Class syllabus:</b><br>According to the assignment of the bachelor's thesis and the instructions of the supervisor                                                                                       |                                            |
| <b>State exam syllabus:</b>                                                                                                                                                                                 |                                            |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                       |                                            |
| <b>Last change:</b> 10.03.2022                                                                                                                                                                              |                                            |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                           |                                            |

## COURSE DESCRIPTION

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------------------------------------------|-----|-----|-----|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                    |      |                                                 |     |     |     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                  |      |                                                 |     |     |     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                    |      |                                                 |     |     |     |
| <b>Course ID:</b><br>FMFI.KAFZM/1-FYZ-323/22                                                                                                                                                                                       |      | <b>Course title:</b><br>Bachelor Thesis Seminar |     |     |     |
| <b>Educational activities:</b><br><b>Type of activities:</b> seminar / independent work<br><b>Number of hours:</b><br><b>per week:</b> 2 / 1 <b>per level/semester:</b> 26 / 13<br><b>Form of the course:</b> on-site learning     |      |                                                 |     |     |     |
| <b>Number of credits:</b> 2                                                                                                                                                                                                        |      |                                                 |     |     |     |
| <b>Recommended semester:</b> 8.                                                                                                                                                                                                    |      |                                                 |     |     |     |
| <b>Educational level:</b> I.                                                                                                                                                                                                       |      |                                                 |     |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                              |      |                                                 |     |     |     |
| <b>Course requirements:</b><br>Interim evaluation: presentation<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): Weight of the intermediate / final evaluation: 100/0 |      |                                                 |     |     |     |
| <b>Learning outcomes:</b><br>After completing the course, students will be able to present the studied scientific issues and their own results to a professional audience.                                                         |      |                                                 |     |     |     |
| <b>Class syllabus:</b><br>Issues from professional monographs and scientific periodicals individually determined by the supervisor of the bachelor's thesis.                                                                       |      |                                                 |     |     |     |
| <b>Recommended literature:</b><br>Monographs and original works from scientific periodicals determined individually according to the assignment of the bachelor's thesis                                                           |      |                                                 |     |     |     |
| <b>Languages necessary to complete the course:</b><br>Slovak / English (study literature in Slovak or English)                                                                                                                     |      |                                                 |     |     |     |
| <b>Notes:</b>                                                                                                                                                                                                                      |      |                                                 |     |     |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 48                                                                                                                                                           |      |                                                 |     |     |     |
| A                                                                                                                                                                                                                                  | B    | C                                               | D   | E   | FX  |
| 93,75                                                                                                                                                                                                                              | 6,25 | 0,0                                             | 0,0 | 0,0 | 0,0 |
| <b>Lecturers:</b> doc. Mgr. Jozef Kristek, DrSc.                                                                                                                                                                                   |      |                                                 |     |     |     |
| <b>Last change:</b> 22.02.2022                                                                                                                                                                                                     |      |                                                 |     |     |     |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                  |      |                                                 |     |     |     |

## COURSE DESCRIPTION

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                    |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                    |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                    |
| <b>Course ID:</b><br>FMFI-PriF.KBCh/1-KXX-004/20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Course title:</b><br>Basic Chemical Calculation |
| <b>Educational activities:</b><br><b>Type of activities:</b> seminar<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                    |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                    |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                    |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                    |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                    |
| <b>Course requirements:</b><br>Two written test with 30 and 70 points during the semester. A: 90%, B: 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                    |
| <b>Learning outcomes:</b><br>Overview of high school curriculum: types of chemical formulas, methods of expressing the amount of chemical substances, composition of solutions, definition and determination of oxidation number and its use in nomenclature and redox reactions. Learn to write non-redox and redox chemical reactions. Mastering stoichiometric calculations.                                                                                                                                                                                                                                      |                                                    |
| <b>Class syllabus:</b><br>Basic quantities used in chemical calculations: amount of substance, volume, mass, the number of particles. The relationship between the amount of substance and the volume of an ideal gas. Quantities expressing the composition of solutions. Calculations with mass fraction and mass concentration. Balance equations. Calculations with molality, volume fraction and mass concentration. Recalculations of different ways of composition of solutions. Solubility and preparation of saturated solutions. Stoichiometry of chemical compounds. Stoichiometry of chemical equations. |                                                    |
| <b>Recommended literature:</b><br>Silný, P. a kol.: Úlohy a modely usmerňovania úloh zo všeobecnej chémie. Expol Pedagogika, 1999.<br>Fajnor, V., Luptáková, V. a Tatiersky, J.: Cvičenia z anorganickej chémie pre biológov. 2. vyd. Bratislava : UK, 2003.<br>Ulická, E., Ulický, L.: Príklady zo všeobecnej a anorganickej chémie. ALFA, SNTL 1984.<br>Tatiersky, J.: Základné chemické výpočty. 2. vyd. Bratislava : UK, 2013.                                                                                                                                                                                   |                                                    |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                    |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                    |

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|-----------------------------------------------------------------------------------------------------------|-------|-------|-------|-------|-----|
| <b>Past grade distribution</b>                                                                            |       |       |       |       |     |
| Total number of evaluated students: 23                                                                    |       |       |       |       |     |
| A                                                                                                         | B     | C     | D     | E     | FX  |
| 13,04                                                                                                     | 21,74 | 26,09 | 13,04 | 17,39 | 8,7 |
| <b>Lecturers:</b> doc. RNDr. Eva Viglašová, PhD., RNDr. Katarína Cifraničová, PhD., RNDr. Dominik Juračka |       |       |       |       |     |
| <b>Last change:</b> 15.03.2022                                                                            |       |       |       |       |     |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                         |       |       |       |       |     |

## COURSE DESCRIPTION

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                           |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                           |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                           |
| <b>Course ID:</b><br>FMFI.KEF/2-FOL-116/15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Course title:</b><br>Basic Electronics |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / laboratory practicals<br><b>Number of hours:</b><br><b>per week:</b> 3 / 3 <b>per level/semester:</b> 39 / 39<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                           |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                           |
| <b>Recommended semester:</b> 7.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                           |
| <b>Educational level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                           |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                           |
| <b>Course requirements:</b><br>Continuous assessment: work on practical exercises (100%). The condition for granting credits is the presentation of a semester project.<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                           |
| <b>Learning outcomes:</b><br>The student will understand the principles of using basic building blocks (resistor, inductance, capacitance, diode, transistor) in digital and analog circuits. They will understand the principles and use of basic digital and analog circuits (gates, counters, timers, operational amplifier, A / D and D / A converters, Arduino microprocessor system), principles of generating harmonic and non-harmonic signals and linear and pulse power supplies. They will be able to analyze basic circuits and use them to design simple electronic circuits with the required functionality. He will also gain practical experience with the construction and revitalization of simple electronic circuits. |                                           |
| <b>Class syllabus:</b><br>Semiconductor diode and transistor and their basic connections. Transistor in switching mode, TTL digital circuits and their use. Basic logic circuits. Comparator. Timer 555. D / A and A / D converters. Arduino microprocessor system. Nodal potential method. Analysis of linear circuits in time and frequency domain. Linear model of transistor and operational amplifier. Basic circuits with operational amplifier. Positive feedback and oscillator principles. Power supplies and rectifiers.                                                                                                                                                                                                        |                                           |
| <b>Recommended literature:</b><br>The art of electronics / Paul Horowitz, Winfield Hill. New York : Cambridge University Press, 1989                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                           |
| <b>Languages necessary to complete the course:</b><br>English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                           |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                           |

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|---------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|------|
| <b>Past grade distribution</b>                                                                                      |     |     |     |     |      |
| Total number of evaluated students: 138                                                                             |     |     |     |     |      |
| A                                                                                                                   | B   | C   | D   | E   | FX   |
| 96,38                                                                                                               | 0,0 | 2,9 | 0,0 | 0,0 | 0,72 |
| <b>Lecturers:</b> doc. RNDr. František Kundracik, CSc., doc. RNDr. Matej Klas, PhD., doc. RNDr. Juraj Országh, PhD. |     |     |     |     |      |
| <b>Last change:</b> 27.06.2022                                                                                      |     |     |     |     |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                   |     |     |     |     |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                                   |     |      |       |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                      |       |                                                   |     |      |       |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                        |       |                                                   |     |      |       |
| <b>Course ID:</b><br>FMFI-PriF.KJCh/1-KXX-014/20                                                                                                                                                                                                                                                                                                                                                                                       |       | <b>Course title:</b><br>Basic Laboratory Practice |     |      |       |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 <b>per level/semester:</b> 52<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                  |       |                                                   |     |      |       |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                                   |     |      |       |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                                   |     |      |       |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                                   |     |      |       |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                   |     |      |       |
| <b>Course requirements:</b><br>Regular tests and written protocols. A:90%, B:80%, C:70%, D:60%, E:50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                |       |                                                   |     |      |       |
| <b>Learning outcomes:</b><br>While working in the laboratory, the student will gain basic practical experience and skills in a chemical laboratory.                                                                                                                                                                                                                                                                                    |       |                                                   |     |      |       |
| <b>Class syllabus:</b><br>Physical quantities and units. Laboratory glassware. Weighing, measuring the volume of liquid. Preparation and dilution of solutions. Quantitative analysis. Basic laboratory operations (crystallization, filtration, decantation, drying, etc.)                                                                                                                                                            |       |                                                   |     |      |       |
| <b>Recommended literature:</b><br>Nagyová I., Melichová Z., Kmeťová J.: Laboratórna technika. FPV UMB, Banská. Bystrica, 2010.<br>Tatiersky J.: Základné chemické výpočty. UK, Bratislava, 2011.<br>Galamboš M., Tatiersky J., Krivosudský L. a kol.: Názvoslovie anorganických látok. UK, Bratislava, 2021.<br>Fajnor, V., Luptáková, V. a Tatiersky, J.: Cvičenia z anorganickej chémie pre biológov. 2. vyd. Bratislava : UK, 2003. |       |                                                   |     |      |       |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                  |       |                                                   |     |      |       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                                   |     |      |       |
| <b>Past grade distribution</b><br>Total number of evaluated students: 16                                                                                                                                                                                                                                                                                                                                                               |       |                                                   |     |      |       |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                      | B     | C                                                 | D   | E    | FX    |
| 37,5                                                                                                                                                                                                                                                                                                                                                                                                                                   | 18,75 | 12,5                                              | 0,0 | 12,5 | 18,75 |

|                                                   |
|---------------------------------------------------|
| <b>Lecturers:</b> RNDr. Dominik Juračka           |
| <b>Last change:</b> 10.10.2022                    |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                 |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                 |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                 |
| <b>Course ID:</b><br>FMFI-PriF.KAgCh/1-KXX-005/20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Course title:</b><br>Basics of Chemistry (1) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / seminar<br><b>Number of hours:</b><br><b>per week:</b> 2 / 3 <b>per level/semester:</b> 26 / 39<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                 |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                 |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                 |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                 |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                 |
| <b>Course requirements:</b><br>Regular tests, final exam. A:92%, B:84%, C:76%, D:68%, E:60%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                 |
| <b>Learning outcomes:</b><br>The student is able to define concepts, quantities and laws in the field of chemistry, can explain the principles of chemical processes, apply knowledge in solving chemical problems related to everyday life. He/she knows the connections between the composition, structure and properties of substances.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                 |
| <b>Class syllabus:</b><br>Basic concepts and most important constants. Atomic nucleus; nuclear transformations; nuclear reactions. Electron shell of an atom; quantum numbers, orbitals, electron configuration of chemical elements. Periodic table of elements, classification of elements. Strong and weak interactions between particles, chemical bonding. Electronegativity of an atom. Oxidation number. Nomenclature. Charge number. Binding polarity. Molecule structure; localized electron pair theory. Polarity of molecules and substances. Isomerism. Group states of substances. Systems of substances - pure substance, element, compound, mixture. Solutions; composition of solutions. Chemical reactions, chemical equations. Types of chemical reactions. Thermodynamics and rate of chemical reactions, chemical equilibrium. Acids and bases, acid-base reactions, hydrolysis of salts. The concept of pH, strength and saturation of acids and bases. Redox reactions. Precipitation reactions. Complexation reactions. |                                                 |
| <b>Recommended literature:</b><br>Galamboš, M. a i.: Názvoslovie anorganických látok. 2. oprav. a rozš. vyd. Bratislava: Univerzita Komenského, 2011.<br>Žúrková, Ľ. a i.: Všeobecná chémia. 1. vyd. Bratislava : SPN, 1985.<br>Krätsmár-Šmogrovič a kol.: Všeobecná a anorganická chémia, vyd. Martin, Osveta 2007.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                 |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                 |

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|------------------------------------------------------------------------|-------|-------|------|------|-------|
| <b>Notes:</b>                                                          |       |       |      |      |       |
| <b>Past grade distribution</b>                                         |       |       |      |      |       |
| Total number of evaluated students: 30                                 |       |       |      |      |       |
| A                                                                      | B     | C     | D    | E    | FX    |
| 16,67                                                                  | 26,67 | 16,67 | 10,0 | 6,67 | 23,33 |
| <b>Lecturers:</b> Mgr. Martin Motola, PhD., RNDr. Jana Chrappová, PhD. |       |       |      |      |       |
| <b>Last change:</b> 17.10.2022                                         |       |       |      |      |       |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                      |       |       |      |      |       |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                 |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                 |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                 |
| <b>Course ID:</b><br>FMFI-PriF.KAgCh/1-KXX-015/20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Course title:</b><br>Basics of Chemistry (2) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / seminar<br><b>Number of hours:</b><br><b>per week:</b> 2 / 3 <b>per level/semester:</b> 26 / 39<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                 |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                 |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                 |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                 |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                 |
| <b>Course requirements:</b><br>Regular tests, final exam. A:92%, B:84%, C:76%, D:68%, E:60%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                 |
| <b>Learning outcomes:</b><br>The student will gain basic knowledge about common chemical elements and their compounds, will know their properties, use in everyday life and their impact on living organisms and the environment. He knows the basic division of organic substances, their properties and impact on the environment.                                                                                                                                                                                                                                                                                                                    |                                                 |
| <b>Class syllabus:</b><br>1. Hydrogen, alkali metals, alkaline earth metals, water, water hardness. 2. Aluminum, carbon, silicon, nitrogen, phosphorus, greenhouse gases, glass and ceramics. 3. Oxygen, sulfur, ozone, acid rain. 4. Halogens, rare gases. 5. Chromium, manganese, iron, steel, corrosion. 6. Copper subgroup and zinc subgroup, amalgam. 7. Characteristics and distribution of organic substances 8. Bonding of atoms, chemical formulas of organic compounds, nomenclature 9. Acid-base equilibria in organic chemistry, electron effects 10. Hydrocarbons 11. Hydrocarbon derivatives (X, OH, N) 12. Hydrocarbon derivatives (C=O) |                                                 |
| <b>Recommended literature:</b><br>Silný P., Brestenská, B. Prehľad chémie 1, SPN, 2000.<br>Zahradník, P., Kollárová, M. Prehľad chémie 2, SPN, 2002.<br>Krätsmár-Šmogrovič a kol.: Všeobecná a anorganická chémia, vyd. Martin, Osveta 2007                                                                                                                                                                                                                                                                                                                                                                                                             |                                                 |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                 |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                 |

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| <b>Past grade distribution</b>                                                     |       |       |       |     |       |
| Total number of evaluated students: 17                                             |       |       |       |     |       |
| A                                                                                  | B     | C     | D     | E   | FX    |
| 17,65                                                                              | 11,76 | 29,41 | 11,76 | 0,0 | 29,41 |
| <b>Lecturers:</b> Mgr. Henrieta Stankovičová, PhD., doc. Svitlana Vitushkina, PhD. |       |       |       |     |       |
| <b>Last change:</b> 17.10.2022                                                     |       |       |       |     |       |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                  |       |       |       |     |       |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                   |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                   |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                   |
| <b>Course ID:</b><br>FMFI.KAG/1-KXX-007/20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Course title:</b><br>Basics of Mathematics (1) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                   |
| <b>Number of credits:</b> 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                   |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                   |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                   |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                   |
| <b>Course requirements:</b><br>The student can get 50% for exercises and 50% for the final exam. The student must obtain at least half of the points for the exercises in order to pass to the final exam. During the teaching part of the semester, the student obtains points via written homework assignments.<br>The final exam consists of a passfail test (10%) and a regular test (20% examples, 20% theoretical questions). Successful completion (8 points out of 10 points) of the passfail test is a necessary condition for admission to the regular test. To successfully pass the final exam, it is necessary to obtain at least half of the points together for both of the final exam tests.<br>Grading: A (100-92), B (91-84), C (83-76), D (75-68), E (67-60), Fx (<60).<br>Scale of assessment (preliminary/final): Preliminary assessment 50% (written homework assignments) / 50% final exam (10% passfail and 40% regular test).                                                                    |                                                   |
| <b>Learning outcomes:</b><br>Students will gain the necessary skills in manipulation with numbers, mathematical expressions, elementary functions. They will expand their knowledge of geometry.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                   |
| <b>Class syllabus:</b> <ol style="list-style-type: none"> <li>1. Mathematical terminology and mathematical logic. Basics of proper mathematical expression and designation.</li> <li>2. Logical formulae and proofs. Types of mathematical proofs illustrated in elementary examples.</li> <li>3. Sets and number sets (basic operations with numbers and expressions, numbers, various notations, fractions). Numbers and their geometric representation on a line (absolute value and its geometric meaning).</li> <li>4. Elementary number theory, divisibility, prime numbers, compound numbers.</li> <li>5. Expressions, linear and quadratic expressions with variables. Properties of mathematical operations (commutation, distribution, simplification, etc.)</li> <li>6. Elementary functions (polynomial, linear, quadratic, n-th power and n-th root, trigonometric, exponential, logarithmic functions, their properties and calculation). The graph of a real function and its basic properties.</li> </ol> |                                                   |

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| 7. Equations and inequalities of one variable (linear and quadratic, with absolute value, with n-th power and n-th root, trigonometric, exponential, logarithmic). Calculator vs. adjustment before enumeration. |       |       |       |      |       |
| <b>Recommended literature:</b><br>Základy matematiky / Mário Boroš : Ikar, 2016<br>Seminár z matematiky 1-3 / Zbyněk Kubáček, Ján Žabka : Mapa Slovakia                                                          |       |       |       |      |       |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                            |       |       |       |      |       |
| <b>Notes:</b>                                                                                                                                                                                                    |       |       |       |      |       |
| <b>Past grade distribution</b><br>Total number of evaluated students: 149                                                                                                                                        |       |       |       |      |       |
| A                                                                                                                                                                                                                | B     | C     | D     | E    | FX    |
| 9,4                                                                                                                                                                                                              | 28,19 | 16,11 | 10,07 | 2,01 | 34,23 |
| <b>Lecturers:</b> RNDr. Martina Bátorová, PhD.                                                                                                                                                                   |       |       |       |      |       |
| <b>Last change:</b> 18.10.2022                                                                                                                                                                                   |       |       |       |      |       |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                |       |       |       |      |       |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                   |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                   |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                   |
| <b>Course ID:</b><br>FMFI.KAG/1-KXX-017/20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Course title:</b><br>Basics of Mathematics (2) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                   |
| <b>Number of credits:</b> 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                   |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                   |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                   |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                   |
| <b>Course requirements:</b><br>The student can get 50% for exercises and 50% for the final exam. The student must obtain at least half of the points for the exercises in order to pass to the final exam. During the teaching part of the semester, the student obtains points via written homework assignments.<br>The final exam consists of a passfail test (10%) and a regular test (20% examples, 20% theoretical questions). Successful completion (8 points out of 10 points) of the passfail test is a necessary condition for admission to the regular test. To successfully pass the final exam, it is necessary to obtain at least half of the points together for both of the final exam tests.<br>Grading: A (100-92), B (91-84), C (83-76), D (75-68), E (67-60), Fx (<60).<br>Scale of assessment (preliminary/final): Preliminary assessment 50% (written homework assignments) / 50% final exam (10% passfail and 40% regular test). |                                                   |
| <b>Learning outcomes:</b><br>Students will acquire the necessary skills in mathematical operations with complex numbers, combinatorics, basics of probability and statistics, and analytical and synthetic geometry in the plane and space.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                   |
| <b>Class syllabus:</b><br>8. Basics of calculating sequences and series (arithmetic and geometric sequence, partial sums) and their applications.<br>9. Linear equations and inequalities with two or three unknowns and their solutions. Equation and inequalities with parameters.<br>10. Elementary analytical geometry in the plane (vectors, lines, triangle, polygon, circle, conic section, scalar product) and its relationship with solutions of equations. Isometries and similarities in plane.<br>11. Elementary analytical geometry in space (planes, vector product). Basic bodies and their imaging.<br>12. Complex numbers, calculations and their geometric properties (representations, basic operations, complex n-th power and n-th root, Moivre's theorem)<br>13. Basic combinatorial procedures without using the traditional formulae                                                                                           |                                                   |

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| 14. Basic concept of probability and statistics (reading diagrams and understanding of basic statistical indicators, basic understanding of the relationship between truth and statistical indicator) |       |       |       |      |       |
| 15. Limits via geometric and computational methods (basic rules of calculating limits, derivatives of elementary functions, graphs of functions and their properties)                                 |       |       |       |      |       |
| <b>Recommended literature:</b>                                                                                                                                                                        |       |       |       |      |       |
| Základy matematiky / Mário Boroš : Ikar, 2016                                                                                                                                                         |       |       |       |      |       |
| Seminár z matematiky 1-3 / Zbyněk Kubáček, Ján Žabka : Mapa Slovakia                                                                                                                                  |       |       |       |      |       |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                    |       |       |       |      |       |
| Slovak, English                                                                                                                                                                                       |       |       |       |      |       |
| <b>Notes:</b>                                                                                                                                                                                         |       |       |       |      |       |
| <b>Past grade distribution</b>                                                                                                                                                                        |       |       |       |      |       |
| Total number of evaluated students: 83                                                                                                                                                                |       |       |       |      |       |
| A                                                                                                                                                                                                     | B     | C     | D     | E    | FX    |
| 10,84                                                                                                                                                                                                 | 13,25 | 21,69 | 18,07 | 4,82 | 31,33 |
| <b>Lecturers:</b> RNDr. Martina Bátorová, PhD.                                                                                                                                                        |       |       |       |      |       |
| <b>Last change:</b> 18.10.2022                                                                                                                                                                        |       |       |       |      |       |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                     |       |       |       |      |       |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                |                                        |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |
| <b>Course ID:</b><br>FMFI.KAI/1-AIN-407/22                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Course title:</b><br>Brain and Mind |
| <b>Educational activities:</b><br><b>Type of activities:</b> course<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                       |                                        |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |
| <b>Recommended semester:</b> 1., 3., 5.                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                        |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |
| <b>Course requirements:</b><br>Continuous assessment: presence (30%), presentation (40%), bonus assignments (30%)<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                            |                                        |
| <b>Learning outcomes:</b><br>The course objectives are to make the students familiar with major theories and methods of mind/brain research.                                                                                                                                                                                                                                                                                                                                     |                                        |
| <b>Class syllabus:</b><br>The subject of the course is the human mind and brain from the perspective of neuroscience, computer science, psychology, and philosophy. It is mainly focused on the interdisciplinary study of consciousness: its neural correlates, neuroscience and behavioral research methods, and major theories.                                                                                                                                               |                                        |
| <b>Recommended literature:</b><br>S. Blackmore, E.T. Troscianko: Consciousness. An Introduction. Routledge, third edition 2018.<br>M.S. Gazzaniga, R.B. Ivry, G.R. Mangun: Cognitive Neuroscience. The Biology of the Mind. W.W. Norton & company, fifth edition 2019.<br>J. Friedenberg, G. Silverman: Cognitive Science. An Introduction to the Study of Mind. Sage 2012.<br>T. Metzinger: The Ego Tunnel. The Science of the Mind and the Myth of the self. Basic Books 2009. |                                        |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                        |

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| <b>Past grade distribution</b>                                            |       |       |       |      |      |
| Total number of evaluated students: 263                                   |       |       |       |      |      |
| A                                                                         | B     | C     | D     | E    | FX   |
| 49,43                                                                     | 14,83 | 12,55 | 11,03 | 4,18 | 7,98 |
| <b>Lecturers:</b> RNDr. Barbora Cimrová, PhD., doc. PhDr. Ján Rybár, PhD. |       |       |       |      |      |
| <b>Last change:</b> 04.07.2022                                            |       |       |       |      |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                         |       |       |       |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                          |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                          |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                          |
| <b>Course ID:</b><br>FMFI.KJFB/1-FYZ-871/20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Course title:</b><br>Chemical Physics |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 3 / 3 <b>per level/semester:</b> 39 / 39<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                          |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |
| <b>Recommended semester:</b> 8.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                          |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                          |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                          |
| <b>Course requirements:</b><br>Continuous assessment: homework<br>Exam: oral<br>The evaluation of the subject takes place in the form of continuous (individual work) and final evaluation (oral exam). Successful completion of the course reflects the student's sufficient orientation in the issue. The course will be graded as provided the student demonstrates compliance with at least 51%. The conditions for successful completion of the course are in accordance with the Study Regulations of FMFI UK<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 51%<br>Scale of assessment (preliminary/final): Weight of the intermediate / final evaluation: 30/70                                                                                                                                                                                                                                                                                                                                                                                                                          |                                          |
| <b>Learning outcomes:</b><br>Understand the importance of quantum mechanical description of substances at the molecular level - the basis of theoretical approaches to the study of their reactions.<br>Subject of interest - quantum mechanical description of molecules and their aggregates. To master the practical tasks of solving the electron shell of molecules using current methods of quantum chemistry.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                          |
| <b>Class syllabus:</b><br>Standard molecular Hamiltonian. Atomic system of units. Born - Oppenheimer approximation. Potential energy surface (curve). Solution of the electron Schrodinger equation MO-LCAO approximation. Electron repulsion - model of independent particles. Huckel approximation, Hartre approximation, Hartree-Fock approximation, Coulomb and exchange integral. Practical applications for solving the structure of molecules.<br>Nuclear Schrodinger equation, its solution for diatomic molecules. Model rigid rotor-harmonic oscillator, separation of vibrational and rotational motion fault processing of their interaction. Practical demonstration - calculation of spectroscopic constants of a selected diatomic molecule. Rotation of polyatomic molecules, rotational levels, rotational constants. Vibrations of polyatomic molecules - vibrational levels, normal modes.<br>Symmetry of molecular systems. Dynamic aspects of molecular systems. Transit state methods, collision theory, quasiclassical trajectory method. Environmental influence - methods of solvation |                                          |

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| description. Methods considering dielectric continuum and non-methods considering discrete solvent.                                                      |       |       |      |      |     |
| <b>Recommended literature:</b><br>Atkins P, Friedman R (2005) Molecular Quantum Mechanics Fourth Edition<br>Szabo A, Ostlund NS Modern Quantum Chemistry |       |       |      |      |     |
| <b>Languages necessary to complete the course:</b><br>Slovak in combination with English (study literature also in English)                              |       |       |      |      |     |
| <b>Notes:</b>                                                                                                                                            |       |       |      |      |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 26                                                                                 |       |       |      |      |     |
| A                                                                                                                                                        | B     | C     | D    | E    | FX  |
| 50,0                                                                                                                                                     | 19,23 | 15,38 | 7,69 | 7,69 | 0,0 |
| <b>Lecturers:</b> doc. RNDr. Peter Papp, PhD., Mgr. Ivan Sukuba, PhD., RNDr. Ing. Milan Melicherčík, PhD.                                                |       |       |      |      |     |
| <b>Last change:</b> 20.06.2022                                                                                                                           |       |       |      |      |     |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                        |       |       |      |      |     |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                    |       |                                              |      |     |       |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                  |       |                                              |      |     |       |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                    |       |                                              |      |     |       |
| <b>Course ID:</b><br>FMFI.KAI/1-AIN-408/22                                                                                                                                                                                                                                                         |       | <b>Course title:</b><br>Cognitive Laboratory |      |     |       |
| <b>Educational activities:</b><br><b>Type of activities:</b> course<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                         |       |                                              |      |     |       |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                        |       |                                              |      |     |       |
| <b>Recommended semester:</b> 1., 3., 5.                                                                                                                                                                                                                                                            |       |                                              |      |     |       |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                                                                                |       |                                              |      |     |       |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                              |       |                                              |      |     |       |
| <b>Course requirements:</b><br>Interim evaluation: presentations<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                               |       |                                              |      |     |       |
| <b>Learning outcomes:</b><br>Acquisition of methods for studying various cognitive phenomena (data collection and analysis) using an online cognitive laboratory.                                                                                                                                  |       |                                              |      |     |       |
| <b>Class syllabus:</b><br>Demonstration of 40 standard experiments in the fields of neurocognition, mechanisms of perception, attention systems, memory processes, speech production and perception, knowledge representation (concepts and mental ideas), judgment and decision-making processes. |       |                                              |      |     |       |
| <b>Recommended literature:</b><br>CogLab / Greg Francis, Ian Neath, Daniel R. VanHorn. Thomson/Wadsworth, 2014                                                                                                                                                                                     |       |                                              |      |     |       |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                              |       |                                              |      |     |       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                      |       |                                              |      |     |       |
| <b>Past grade distribution</b><br>Total number of evaluated students: 106                                                                                                                                                                                                                          |       |                                              |      |     |       |
| A                                                                                                                                                                                                                                                                                                  | B     | C                                            | D    | E   | FX    |
| 67,92                                                                                                                                                                                                                                                                                              | 11,32 | 8,49                                         | 0,94 | 0,0 | 11,32 |
| <b>Lecturers:</b> doc. PhDr. Ján Rybár, PhD.                                                                                                                                                                                                                                                       |       |                                              |      |     |       |
| <b>Last change:</b> 17.05.2024                                                                                                                                                                                                                                                                     |       |                                              |      |     |       |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                                                  |       |                                              |      |     |       |

## COURSE DESCRIPTION

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                                                                  |       |       |       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------------------------------------------------------|-------|-------|-------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                                                                  |       |       |       |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                                                                  |       |       |       |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                                                                  |       |       |       |
| <b>Course ID:</b><br>FMFI.KAG/1-KXX-002/20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      | <b>Course title:</b><br>Complementary Classes in Mathematics (1) |       |       |       |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |                                                                  |       |       |       |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |                                                                  |       |       |       |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                                                                  |       |       |       |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |                                                                  |       |       |       |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                                                                  |       |       |       |
| <b>Course requirements:</b><br>Homeworks (written solutions of problems and their consulting 100%). Rough evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                                                                  |       |       |       |
| <b>Learning outcomes:</b><br>Students gain basic skill in computation with numbers, mathematical expressions, elementary functions. They extend the knowledge on elementary geometry.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                                                                  |       |       |       |
| <b>Class syllabus:</b><br>1. Basic operations with numbers and expressions (numbers, notation, fractions, linear and quadratic expressions with variables, commutativity, distributivity, simplification, etc.)<br>2. Relations of numbers and their geometric representation on a straight line, absolute value and its geometric significance, equations and inequalities with one variable and absolute value<br>3. Elementary functions (polynomials, roots, sin, cos, exp, ln) and their relations, properties and computing with them, equations and inequities, calculator vs. adjustment before enumeration.<br>4. Linear equations with two, three unknowns and their solution<br>5. Elementary analytical geometry in plane and space (vectors, straight lines, plane, triangle, circle, cone, solids) and link with the solutions of equations |      |                                                                  |       |       |       |
| <b>Recommended literature:</b><br>Lecturer materials.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                                                                  |       |       |       |
| <b>Languages necessary to complete the course:</b><br>English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                                                                  |       |       |       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                                                                  |       |       |       |
| <b>Past grade distribution</b><br>Total number of evaluated students: 126                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                                                                  |       |       |       |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | B    | C                                                                | D     | E     | FX    |
| 31,75                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 7,94 | 14,29                                                            | 14,29 | 14,29 | 17,46 |

|                                                                                                              |
|--------------------------------------------------------------------------------------------------------------|
| <b>Lecturers:</b> doc. RNDr. Pavel Chalmovianský, PhD., RNDr. Klaudia Hamajová, RNDr. Martina Bátorová, PhD. |
| <b>Last change:</b> 22.06.2022                                                                               |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                            |

## COURSE DESCRIPTION

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------------------------------------------------|-------|------|-------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                                                  |       |      |       |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                                                  |       |      |       |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                                                  |       |      |       |
| <b>Course ID:</b><br>FMFI.KAG/1-KXX-012/20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       | <b>Course title:</b><br>Complementary Classes in Mathematics (2) |       |      |       |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                                                  |       |      |       |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                                                  |       |      |       |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                                                  |       |      |       |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                                                  |       |      |       |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                                  |       |      |       |
| <b>Course requirements:</b><br>Homeworks (written solutions of problems and their consulting 100%). Rough evaluation scale: A (100-92), B (91-84), C (83-76), D (75-68), E (67-60), Fx (<60)<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                                                  |       |      |       |
| <b>Learning outcomes:</b><br>Students extends their knowledge and skills in mathematical operations with complex numbers, combinatorics, basic probability and the description of elementary functions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                                                  |       |      |       |
| <b>Class syllabus:</b><br>6 . complex numbers, computation and their geometric properties<br>7. elementary number theory, divisibility, prime numbers, graphs<br>8. basic combinatorial methods and solutions without the help of traditional formulas<br>9. basic notion of probability and statistics, reading diagrams and understanding of basic statistical indicators, basic understanding of the relationship between truth and statistical indicator<br>10. basics of calculating sequences and series, partial sums, applications (interest, ...)<br>11. concept of limits geometrically and computationally, basic rules of limit calculation, derivatives of elementary functions, course of function<br>12. logic and the need for proof illustrated in elementary examples |       |                                                                  |       |      |       |
| <b>Recommended literature:</b><br>Lecturers materials.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                                  |       |      |       |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                                  |       |      |       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                                                  |       |      |       |
| <b>Past grade distribution</b><br>Total number of evaluated students: 68                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                                                  |       |      |       |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | B     | C                                                                | D     | E    | FX    |
| 29,41                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 11,76 | 13,24                                                            | 17,65 | 7,35 | 20,59 |

|                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------|
| <b>Lecturers:</b> doc. RNDr. Pavel Chalmovianský, PhD., Mgr. Adriana Malovec Bosáková, PhD.,<br>RNDr. Martina Bátorová, PhD. |
| <b>Last change:</b> 25.10.2022                                                                                               |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                            |

## COURSE DESCRIPTION

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                              |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                              |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                              |
| <b>Course ID:</b><br>FMFI.KDMFI/1-KXX-001/20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Course title:</b><br>Complementary Classes in Physics (1) |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                              |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                              |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                              |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                              |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                              |
| <b>Course requirements:</b><br>A:90%, B:80%, C:70%, D:60%, E:50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                              |
| <b>Learning outcomes:</b><br>Students will develop skills to solve complex physical problems at the level corresponding to the target requirements for the high-school final examination in physics in the areas listed in the brief syllabus.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                              |
| <b>Class syllabus:</b><br>Complex problems in the context of water (hydrostatic force in a liquid, Archimedes' law, continuity equation for liquids and gases, Bernoulli's equation for liquids, resistive force when moving a solid in a liquid)<br>Complex tasks in the context of electricity and magnetism (motion of a charged particle in a homogeneous electric and in a homogeneous magnetic field, motion of a conductor in a magnetic field, motion of a magnet in a coil)<br>Complex tasks in the context of sound (origin of sound, speed of sound propagation, equation of gradual waves, standing waves on a stretched string and on an air column, sound interference)<br>Complex tasks in the contexts of photoelectric effect and X-rays. |                                                              |
| <b>Recommended literature:</b><br>Fyzika pre gymnázium - všeobecnovzdelávací kurz : Experimentálny učebný text pre všeobecnovzdelávací program vyučovania fyziky v prvých dvoch ročníkoch štvorročného gymnázia. (Pracovná verzia) / Viera Lapitková, Václav Koubek, Peter Demkanin. Bratislava : Knižničné a edičné centrum FMFI UK, 2006<br>Fyzika pre 2. ročník gymnázia a 6. ročník gymnázia s osemročným štúdiom / Peter Demkanin ... [et al.]. Bratislava : Združenie EDUCO, 2013<br>Fyzika pre 3. ročník gymnázia a 7. ročník gymnázia s osemročným štúdiom / Peter Demkanin, Martina Horváthová. Prievidza : EDUCO, 2012<br>Physics : Principles with applications / Douglas C. Giancoli. Harlow : Pearson Education, 2016                         |                                                              |

Fyzika 1 / David Halliday, Robert Resnick, Jearl Walker ; redakce českého vydání Petr Dub ; přeložili Miroslav Černý ... [et al.]. Brno : VUTIUM, 2013

**Languages necessary to complete the course:**

Slovak, English

**Notes:**

**Past grade distribution**

Total number of evaluated students: 108

| A     | B     | C     | D    | E    | FX    |
|-------|-------|-------|------|------|-------|
| 34,26 | 18,52 | 11,11 | 9,26 | 6,48 | 20,37 |

**Lecturers:** PaedDr. Lukáš Bartošovič, PhD.

**Last change:** 15.03.2022

**Approved by:** doc. RNDr. Tomáš Blažek, PhD.

## COURSE DESCRIPTION

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                              |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                              |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                              |
| <b>Course ID:</b><br>FMFI.KDMFI/1-KXX-011/20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Course title:</b><br>Complementary Classes in Physics (2) |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                              |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                              |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                              |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                              |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                              |
| <b>Course requirements:</b><br>A:90%, B:80%, C:70%, D:60%, E:50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                              |
| <b>Learning outcomes:</b><br>Students will develop skills to solve complex physical problems at the level corresponding to the target requirements for the high-school final examination in physics in the areas listed in the brief syllabus.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                              |
| <b>Class syllabus:</b><br>Complex problems in the context of translational motion of a point mass (force action, momentum, force impulse, Newton's laws of motion, elastic and inelastic collision, explosion, force action for circular motion).<br>Complex problems in the context of a rigid body (moment of inertia, energy of a rotating body)<br>Complex problems in the context of air (ideal gas, ideal gas phenomena, Avogadro's constant, internal energy of a body, heat capacity, energy transfer by flow, conduction and radiation, movement of a body in air).<br>Complex problem in the context of light (beam optics, dispersion, interference and diffraction of light, black body radiation, light and energy levels of atoms)<br>Complex problem in the context of energy conservation law.<br>Complex problem in the context of conservation laws (energy, momentum, electric charge) |                                                              |
| <b>Recommended literature:</b><br>Fyzika pre gymnázium - všeobecnovzdelávací kurz : Experimentálny učebný text pre všeobecnovzdelávací program vyučovania fyziky v prvých dvoch ročníkoch štvorročného gymnázia. (Pracovná verzia) / Viera Lapitková, Václav Koubek, Peter Demkanin. Bratislava : Knižničné a edičné centrum FMFI UK, 2006<br>Fyzika pre 2. ročník gymnázia a 6. ročník gymnázia s osemročným štúdiom / Peter Demkanin ... [et al.]. Bratislava : Združenie EDUCO, 2013<br>Fyzika pre 3. ročník gymnázia a 7. ročník gymnázia s osemročným štúdiom / Peter Demkanin, Martina Horváthová. Prievidza : EDUCO, 2012                                                                                                                                                                                                                                                                          |                                                              |

Physics : Principles with applications / Douglas C. Giancoli. Harlow : Pearson Education, 2016  
 Fyzika 1 / David Halliday, Robert Resnick, Jearl Walker ; redakce českého vydání Petr Dub ; přeložili Miroslav Černý ... [et al.]. Brno : VUTIUM, 2013  
 Fyzika 2 / David Halliday, Robert Resnick, Jearl Walker ; redakce českého vydání Petr Dub ; přeložili Miroslav Černý ... [et al.]. Brno : VUTIUM, 2013

**Languages necessary to complete the course:**

Slovak, English

**Notes:**

**Past grade distribution**

Total number of evaluated students: 47

| A     | B    | C     | D     | E    | FX    |
|-------|------|-------|-------|------|-------|
| 34,04 | 4,26 | 19,15 | 21,28 | 6,38 | 14,89 |

**Lecturers:** PaedDr. Lukáš Bartošovič, PhD.

**Last change:** 15.03.2022

**Approved by:** doc. RNDr. Tomáš Blažek, PhD.

## COURSE DESCRIPTION

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------------------------------------------|------|------|-------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                                               |      |      |       |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                                               |      |      |       |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                                               |      |      |       |
| <b>Course ID:</b><br>FMFI.KEF/1-FYZ-232/22                                                                                                                                                                                                                                                                                                                                                                                                                                                |      | <b>Course title:</b><br>Computational Physics |      |      |       |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 1 / 2 <b>per level/semester:</b> 13 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                  |      |                                               |      |      |       |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |                                               |      |      |       |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                                               |      |      |       |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |                                               |      |      |       |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                                               |      |      |       |
| <b>Course requirements:</b><br>Continuous assessment: elaboration of homework for individual lectures.<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                |      |                                               |      |      |       |
| <b>Learning outcomes:</b><br>The graduate of the course will acquire the skills necessary for the numerical solution of simple physical problems and will learn the basic algorithms of numerical calculations and their programming in a programming language (C ++, Python, ...)..                                                                                                                                                                                                      |      |                                               |      |      |       |
| <b>Class syllabus:</b><br>Numerical stability of simple iteration schemes. Transition from a continuous problem to a discrete one. Numerical solution of the wave equation. Nonlinear iteration schemes. Numerical calculation of integrals. Random numbers. Differential equations: Runge-Kutta methods. Systems of differential equations. Simple physical models, firing method, time evolution of nonlinear physical models, Brownian motion. Simple integral equation, Optimization. |      |                                               |      |      |       |
| <b>Recommended literature:</b><br>W. H. Press et al.: Numerical Recipes. Cambridge Univ. Press, 1992                                                                                                                                                                                                                                                                                                                                                                                      |      |                                               |      |      |       |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                                               |      |      |       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                                               |      |      |       |
| <b>Past grade distribution</b><br>Total number of evaluated students: 262                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                                               |      |      |       |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | B    | C                                             | D    | E    | FX    |
| 57,25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 9,54 | 7,63                                          | 6,11 | 8,02 | 11,45 |
| <b>Lecturers:</b> doc. RNDr. Peter Papp, PhD., doc. Mgr. Jozef Kristek, DrSc.                                                                                                                                                                                                                                                                                                                                                                                                             |      |                                               |      |      |       |
| <b>Last change:</b> 17.05.2022                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |                                               |      |      |       |

**Approved by:** doc. RNDr. Tomáš Blažek, PhD.

## COURSE DESCRIPTION

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                          |       |       |       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------------------------|-------|-------|-------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                          |       |       |       |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                          |       |       |       |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                          |       |       |       |
| <b>Course ID:</b><br>FMFI.KEF/1-FYZ-217/22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       | <b>Course title:</b><br>Electromagnetism |       |       |       |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 / 2 <b>per level/semester:</b> 52 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                          |       |       |       |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                          |       |       |       |
| <b>Recommended semester:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                          |       |       |       |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                          |       |       |       |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                          |       |       |       |
| <b>Course requirements:</b><br>Continuous assessment: written work<br>Exam: oral + written<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 50/50                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                          |       |       |       |
| <b>Learning outcomes:</b><br>By completing the course, the student will understand the basic laws applicable to electric and magnetic fields and will be able to apply them in solving problems.                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                          |       |       |       |
| <b>Class syllabus:</b><br>Electrostatics of charges in vacuum, in the presence of conductors and in dielectrics. Coulomb's law, Gauss's law, electric potential, calculation of electric fields. Electric current, Ohm's law, Kirchhoff's laws. Magnetism and electric currents. Biotov-Savart-Laplace law, Ampere's law, magnetic vector potential, magnetic field in magnetic material, calculation of magnetic fields. Electromagnetic induction, Lenz's rule, inductance and mutual inductance. Alternating electric currents, RLC circuits. Relativity of electric and magnetic field. Electromagnetic waves, Poynting vector. |       |                                          |       |       |       |
| <b>Recommended literature:</b><br>A. Tirpák: Elektromagnetizmus. Iris (2011)<br>D. Halliday, R. Resnick, J. Walker: Fyzika 1-5, Akademické nakladatelství VUTIUM (2007)                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                          |       |       |       |
| <b>Languages necessary to complete the course:</b><br>Slovak / English (study literature in Slovak or English)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                          |       |       |       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                          |       |       |       |
| <b>Past grade distribution</b><br>Total number of evaluated students: 139                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                          |       |       |       |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | B     | C                                        | D     | E     | FX    |
| 25,9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 11,51 | 17,99                                    | 10,79 | 17,27 | 16,55 |

|                                                                                                                    |
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| <b>Lecturers:</b> doc. RNDr. František Kunderacik, CSc., Mgr. Róbert Astaloš, PhD., doc. RNDr. Radoslav Böhm, PhD. |
| <b>Last change:</b> 14.03.2022                                                                                     |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                  |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                         |      |                                                         |      |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                       |      |                                                         |      |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                         |      |                                                         |      |      |      |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-233/13                                                                                                                                                                                                                                                                                                                                                                                              |      | <b>Course title:</b><br>English Conversation Course (1) |      |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                          |      |                                                         |      |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                             |      |                                                         |      |      |      |
| <b>Recommended semester:</b> 3., 5.                                                                                                                                                                                                                                                                                                                                                                                                     |      |                                                         |      |      |      |
| <b>Educational level:</b> I., I.II., II.                                                                                                                                                                                                                                                                                                                                                                                                |      |                                                         |      |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                   |      |                                                         |      |      |      |
| <b>Course requirements:</b><br>tests, presentations, essays<br>Course prerequisites:<br><a href="https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezhneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/">https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezhneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/</a><br>Scale of assessment (preliminary/final): 100/0 |      |                                                         |      |      |      |
| <b>Learning outcomes:</b><br>Continual improvement of all language skills focused on communication/speaking, listening comprehension and writing. The emphasis is on discourse, lexicology and morphology, word-bank broadening of communicational English as well as English for specific purposes appropriate for university students. This course is a follow up of the previously taught ESP course.                                |      |                                                         |      |      |      |
| <b>Class syllabus:</b><br>This course's focus is to broaden spoken/communicational English for students with B2/C1 level of English knowledge.                                                                                                                                                                                                                                                                                          |      |                                                         |      |      |      |
| <b>Recommended literature:</b><br>Appropriate study material is supplied based on the participants' level of English by the lecturer. (Sources- The Guardian, The Herald Morning Sun. The Nine News, The West Australian, BBC News and podcasts, CNN podcasts).                                                                                                                                                                         |      |                                                         |      |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                      |      |                                                         |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                                                         |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 318                                                                                                                                                                                                                                                                                                                                                               |      |                                                         |      |      |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                       | B    | C                                                       | D    | E    | FX   |
| 77,36                                                                                                                                                                                                                                                                                                                                                                                                                                   | 8,81 | 4,4                                                     | 1,26 | 0,94 | 7,23 |
| <b>Lecturers:</b> Mgr. Aneta Barnes                                                                                                                                                                                                                                                                                                                                                                                                     |      |                                                         |      |      |      |

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| <b>Last change:</b> 11.04.2024                    |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                            |      |                                                         |     |     |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                          |      |                                                         |     |     |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                            |      |                                                         |     |     |      |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-234/13                                                                                                                                                                                                                                                                                                                                                                                                 |      | <b>Course title:</b><br>English Conversation Course (2) |     |     |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                             |      |                                                         |     |     |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                |      |                                                         |     |     |      |
| <b>Recommended semester:</b> 4., 6.                                                                                                                                                                                                                                                                                                                                                                                                        |      |                                                         |     |     |      |
| <b>Educational level:</b> I., I.II., II.                                                                                                                                                                                                                                                                                                                                                                                                   |      |                                                         |     |     |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                      |      |                                                         |     |     |      |
| <b>Course requirements:</b><br>tests, oral presentations, essays<br>Course prerequisites:<br><a href="https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebežneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/">https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebežneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/</a><br>Scale of assessment (preliminary/final): 100/0 |      |                                                         |     |     |      |
| <b>Learning outcomes:</b><br>Continual improvement of all language skills focused on communication/speaking, listening comprehension and writing. The emphasis is on discourse, lexicology and morphology, word-bank broadening of communicational/spoken English as well as English for specific purpose appropriate for university students. This course is a follow up of the Conversational English course 1.                          |      |                                                         |     |     |      |
| <b>Class syllabus:</b><br>This course’s focus is to broaden spoken/communicational English for students with B2/C1 level of English knowledge( Upper-Intermediate/Lower Advanced).                                                                                                                                                                                                                                                         |      |                                                         |     |     |      |
| <b>Recommended literature:</b><br>Appropriate study material is supplied based on the participants’level of English by the lecturer. (Sources- The Guardian, The Herald Morning Sun. The Nine News, The West Australian, BBC News and podcasts, CNN podcasts).                                                                                                                                                                             |      |                                                         |     |     |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                         |      |                                                         |     |     |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                              |      |                                                         |     |     |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 201                                                                                                                                                                                                                                                                                                                                                                  |      |                                                         |     |     |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                          | B    | C                                                       | D   | E   | FX   |
| 82,09                                                                                                                                                                                                                                                                                                                                                                                                                                      | 8,96 | 2,49                                                    | 1,0 | 0,0 | 5,47 |
| <b>Lecturers:</b> Mgr. Aneta Barnes                                                                                                                                                                                                                                                                                                                                                                                                        |      |                                                         |     |     |      |

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| <b>Last change:</b> 11.04.2024                    |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                              |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                              |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                              |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-131/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Course title:</b><br>English Language (1) |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                              |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                              |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                              |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                              |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |
| <b>Course requirements:</b><br>Grades: A 93%, B 85%, C 77%, D 70%, E 65%<br>Course prerequisites:<br><a href="https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebežneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/">https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebežneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/</a><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                          |                                              |
| <b>Learning outcomes:</b><br>The objective of the subject is to provide the students with experience and knowledge of technical English and thus make them ready to use English sources of information for later study and professional career.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                              |
| <b>Class syllabus:</b><br>On entering the first semester, students' knowledge of English is tested and they are divided into groups according to the results of the placement test. In the groups of pre-intermediate and intermediate students, fundamentals of technical English are taught. Advanced students take classes of technical English for their field of study: English for mathematics, for physics, for computer science, English for management and economic and financial mathematics.                                                                                                                                                                                                                                                                                                                                                                     |                                              |
| <b>Recommended literature:</b><br>Anglický jazyk pre študentov FMFI UK : Kurz pre mierne pokročilých / Alena Zemanová.<br>Učebnica je nepublikovaná, k dispozícii v elektronickej podobe na webovej stránke KJP.<br>Anglický jazyk pre študentov FMFI UK : Aplikovaná matematika / Alexandra Maďarová, Ľubomíra Kožehubová.- učebnica publikovaná online<br>Anglický jazyk pre študentov FMFI UK : Matematika: Alexandra Maďarová, Eva Foltánová.<br>Učebnica je nepublikovaná, k dispozícii v elektronickej podobe na webovej stránke KJP.<br>Anglický jazyk pre študentov FMFI UK : Fyzika / Alena Zemanová.<br>Učebnica je nepublikovaná, k dispozícii v elektronickej podobe na webovej stránke KJP.<br>Anglický jazyk pre študentov FMFI UK : Informatika / Elena Klátiková.<br>Učebnica je nepublikovaná, k dispozícii v elektronickej podobe na webovej stránke KJP. |                                              |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                              |

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| Slovak, English                                                                                                                                                                                                               |       |       |       |      |     |
| <b>Notes:</b>                                                                                                                                                                                                                 |       |       |       |      |     |
| <b>Past grade distribution</b>                                                                                                                                                                                                |       |       |       |      |     |
| Total number of evaluated students: 7538                                                                                                                                                                                      |       |       |       |      |     |
| A                                                                                                                                                                                                                             | B     | C     | D     | E    | FX  |
| 29,53                                                                                                                                                                                                                         | 22,82 | 18,16 | 12,52 | 7,87 | 9,1 |
| <b>Lecturers:</b> Mgr. Eva Foltánová, Mgr. Ing. Jana Kočvarová, Mgr. Ľubomíra Kožehubová, Mgr. Alexandra Maďarová, Mgr. Aneta Barnes, Mgr. Simona Dobiašová, PhD., Mgr. Valéria Medárová, PhD., Mgr. Katarína Hromadová, PhD. |       |       |       |      |     |
| <b>Last change:</b> 16.09.2025                                                                                                                                                                                                |       |       |       |      |     |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                             |       |       |       |      |     |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                              |       |       |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                              |       |       |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                      |       |                                              |       |       |      |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-132/00                                                                                                                                                                                                                                                                                                                                                                                                           |       | <b>Course title:</b><br>English Language (2) |       |       |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                       |       |                                              |       |       |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                              |       |       |      |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                              |       |       |      |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                              |       |       |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                              |       |       |      |
| <b>Course requirements:</b><br>Grades: A 93%, B 85%, C 77%, D 70%, E 65%<br>Course prerequisites:<br><a href="https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezhneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/">https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezhneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/</a><br>Scale of assessment (preliminary/final): 100/0 |       |                                              |       |       |      |
| <b>Learning outcomes:</b><br>The objective of the subject is to provide the students with experience and knowledge of technical English and thus make them ready to use English sources of information for later study and professional career.                                                                                                                                                                                                      |       |                                              |       |       |      |
| <b>Class syllabus:</b><br>This is a continuation of the course English (1) designed for pre-intermediate students. Fundamental vocabulary is presented through selected topics in mathematics, physics and informatics. The lessons also contain revision of elementary grammar. Generally, it is a necessary preliminary to advanced programs.                                                                                                      |       |                                              |       |       |      |
| <b>Recommended literature:</b><br>Anglický jazyk pre študentov FMFI UK : Kurz pre mierne pokročilých / Alena Zemanová.<br>The textbook has not been published. It is at students' disposal in an electronic format.                                                                                                                                                                                                                                  |       |                                              |       |       |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                |       |                                              |       |       |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                              |       |       |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 1733                                                                                                                                                                                                                                                                                                                                                                           |       |                                              |       |       |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                    | B     | C                                            | D     | E     | FX   |
| 22,1                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 20,95 | 23,83                                        | 14,77 | 11,08 | 7,27 |

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| <b>Lecturers:</b> Mgr. Ing. Jana Kočvarová, Mgr. Alexandra Maďarová, Mgr. Ľubomíra Kožehubová, Mgr. Eva Foltánová, Mgr. Aneta Barnes, Mgr. Simona Dobiašová, PhD., Mgr. Valéria Medárová, PhD. |
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| <b>Last change:</b> 20.06.2022 |
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| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |
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## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                              |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                              |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                              |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-231/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Course title:</b><br>English Language (3) |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                              |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                              |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                              |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                              |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |
| <b>Course requirements:</b><br>Grades: A 93%, B 85%, C 77%, D 70%, E 65%<br>Course prerequisites:<br><a href="https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezhneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/">https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezhneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/</a><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                        |                                              |
| <b>Learning outcomes:</b><br>The objective of the classes is to provide the students with knowledge of technical English in their field of study and experience with technical English sources sufficient to make the able to use technical language for their later study and professional purposes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |
| <b>Class syllabus:</b><br>The subject continues the program of English (2). Students take classes of special English for their field of study: English for mathematics, English for physics, English for computer science, English for management and economic and financial mathematics.<br>The subject requires advanced knowledge of general English.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                              |
| <b>Recommended literature:</b><br>Anglický jazyk pre študentov FMFI UK : Kurz pre mierne pokročilých / Alena Zemanová.<br>Učebnica je nepublikovaná, k dispozícii v elektronickej podobe na webovej stránke KJP.<br>Anglický jazyk pre študentov FMFI UK : Aplikovaná matematika / Alexandra Maďarová, Ľubomíra Kožehubová.- učebnica publikovaná online<br>Anglický jazyk pre študentov FMFI UK : Matematika: Alexandra Maďarová, Eva Foltánová.<br>Učebnica je nepublikovaná, k dispozícii v elektronickej podobe na webovej stránke KJP.<br>Anglický jazyk pre študentov FMFI UK : Fyzika / Alena Zemanová.<br>Učebnica je nepublikovaná, k dispozícii v elektronickej podobe na webovej stránke KJP.<br>Anglický jazyk pre študentov FMFI UK : Informatika / Elena Klátiková.<br>Učebnica je nepublikovaná, k dispozícii v elektronickej podobe na webovej stránke KJP. |                                              |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|-------|-------|-----|
| <b>Notes:</b>                                                                                                                                                                                                                 |       |       |       |       |     |
| <b>Past grade distribution</b>                                                                                                                                                                                                |       |       |       |       |     |
| Total number of evaluated students: 1461                                                                                                                                                                                      |       |       |       |       |     |
| A                                                                                                                                                                                                                             | B     | C     | D     | E     | FX  |
| 15,47                                                                                                                                                                                                                         | 18,96 | 22,72 | 18,21 | 18,14 | 6,5 |
| <b>Lecturers:</b> Mgr. Ing. Jana Kočvarová, Mgr. Alexandra Maďarová, Mgr. Ľubomíra Kožehubová, Mgr. Eva Foltánová, Mgr. Aneta Barnes, Mgr. Simona Dobiašová, PhD., Mgr. Valéria Medárová, PhD., Mgr. Katarína Hromadová, PhD. |       |       |       |       |     |
| <b>Last change:</b> 16.09.2025                                                                                                                                                                                                |       |       |       |       |     |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                             |       |       |       |       |     |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                              |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                              |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                              |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-232/10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Course title:</b><br>English Language (4) |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                              |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                              |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                              |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                              |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |
| <b>Course requirements:</b><br>Examination: an examination consisting of a written and an oral part.<br>Grades: A 93%, B 85%, C 77%, D 70%, E 65%<br>Course prerequisites:<br><a href="https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/skuska-z-predmetu-anglicky-jazyk-4/">https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/skuska-z-predmetu-anglicky-jazyk-4/</a><br>Scale of assessment (preliminary/final): 0/100                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |
| <b>Learning outcomes:</b><br>After completing the course, students will be able to work independently with professional literature in English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                              |
| <b>Class syllabus:</b><br>Students take classes of special English for their field of study: English for mathematics, English for physics, English for computer science, English for management and economic and financial mathematics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                              |
| <b>Recommended literature:</b><br>Anglický jazyk pre študentov FMFI UK : Kurz pre mierne pokročilých / Alena Zemanová.<br>Učebnica je nepublikovaná, k dispozícii v elektronickej podobe na webovej stránke KJP.<br>Anglický jazyk pre študentov FMFI UK : Aplikovaná matematika / Alexandra Maďarová, Ľubomíra Kožehubová.- učebnica publikovaná online<br>Anglický jazyk pre študentov FMFI UK : Matematika: Alexandra Maďarová, Eva Foltánová.<br>Učebnica je nepublikovaná, k dispozícii v elektronickej podobe na webovej stránke KJP.<br>Anglický jazyk pre študentov FMFI UK : Fyzika / Alena Zemanová.<br>Učebnica je nepublikovaná, k dispozícii v elektronickej podobe na webovej stránke KJP.<br>Anglický jazyk pre študentov FMFI UK : Informatika / Elena Klátiková.<br>Učebnica je nepublikovaná, k dispozícii v elektronickej podobe na webovej stránke KJP. |                                              |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |

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| <b>Notes:</b>                                                                                                                                                                                  |       |       |       |      |      |
| <b>Past grade distribution</b>                                                                                                                                                                 |       |       |       |      |      |
| Total number of evaluated students: 4299                                                                                                                                                       |       |       |       |      |      |
| A                                                                                                                                                                                              | B     | C     | D     | E    | FX   |
| 25,17                                                                                                                                                                                          | 28,15 | 21,61 | 11,82 | 6,05 | 7,21 |
| <b>Lecturers:</b> Mgr. Ing. Jana Kočvarová, Mgr. Alexandra Maďarová, Mgr. Ľubomíra Kožehubová, Mgr. Eva Foltánová, Mgr. Aneta Barnes, Mgr. Simona Dobiašová, PhD., Mgr. Valéria Medárová, PhD. |       |       |       |      |      |
| <b>Last change:</b> 16.09.2025                                                                                                                                                                 |       |       |       |      |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                              |       |       |       |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                    |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                    |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                    |
| <b>Course ID:</b><br>FMFI.KEF+KAFZM/1-FYZ-122/25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Course title:</b><br>Error analysis - statistics for physicists |
| <b>Educational activities:</b><br><b>Type of activities:</b> course<br><b>Number of hours:</b><br><b>per week:</b> 3 <b>per level/semester:</b> 39<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                    |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                    |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                    |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                    |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                    |
| <b>Course requirements:</b><br>Interim evaluation: tests<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                    |
| <b>Learning outcomes:</b><br>After completing the course, students will be able to use statistical approaches to process measured data.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                    |
| <b>Class syllabus:</b><br>Random phenomenon, operations with phenomena, probability of a phenomenon and its properties. Independence of phenomena. Bayesian theorem. Random variable of discrete type. Random variable of continuous type. Different types of distribution of random variables. Generation of random variables. Point and interval estimates.<br>Testing of statistical hypotheses - parametric and nonparametric tests. Multidimensional data processing - independence tests.<br>Regression and correlation analysis. Correlation. Theoretical and empirical regression function. Linear regression. Least squares method. Quality of regression function and intensity of dependence. Regression significance test. |                                                                    |
| <b>Recommended literature:</b><br>Andel, J.: Statistické metody. Matfyzpress Praha 2019.<br>Terek M.: Interpretácia štatistiky a dát. Equilibria 2017.<br>F.Kundracik: Spracovanie experimentálnych dát. Univerzita Komenského 1999.<br>Hogg, R., Ledolter, J.: Applied Statistics for Engineers and Physical Scientists. Maxwell Macmillan International 1987                                                                                                                                                                                                                                                                                                                                                                         |                                                                    |
| <b>Languages necessary to complete the course:</b><br>Slovak / English (study literature in Slovak or English).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                    |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                    |

|                                                   |       |       |      |       |      |
|---------------------------------------------------|-------|-------|------|-------|------|
| <b>Past grade distribution</b>                    |       |       |      |       |      |
| Total number of evaluated students: 514           |       |       |      |       |      |
| A                                                 | B     | C     | D    | E     | FX   |
| 42,02                                             | 15,95 | 16,93 | 9,34 | 12,45 | 3,31 |
| <b>Lecturers:</b> doc. Mgr. Jozef Kristek, DrSc.  |       |       |      |       |      |
| <b>Last change:</b> 24.01.2025                    |       |       |      |       |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |       |       |      |       |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                           |       |                                                      |       |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                         |       |                                                      |       |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                           |       |                                                      |       |      |      |
| <b>Course ID:</b><br>FMFL.KTF/1-FYZ-118/16                                                                                                                                                                                                                                                                                                                                |       | <b>Course title:</b><br>Exercises from Mechanics (1) |       |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                            |       |                                                      |       |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                               |       |                                                      |       |      |      |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                                                           |       |                                                      |       |      |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                              |       |                                                      |       |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                     |       |                                                      |       |      |      |
| <b>Course requirements:</b><br>Continuous assessment: papers<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Weight of the intermediate / final evaluation: 100/0<br>Scale of assessment (preliminary/final): Weight of the intermediate / final evaluation: 100/0                                                                                   |       |                                                      |       |      |      |
| <b>Learning outcomes:</b><br>Mechanics                                                                                                                                                                                                                                                                                                                                    |       |                                                      |       |      |      |
| <b>Class syllabus:</b><br>Additional exercise for the subject Mechanics (1). We will practice more simple examples of this subject.                                                                                                                                                                                                                                       |       |                                                      |       |      |      |
| <b>Recommended literature:</b><br>Physics part 1: Mechanics / D. Halliday, R. Resnick, J. Walker / VÚT in Brno, 2003<br>Physics I. / Dionýz Ilkovič / Bratislava, Alfa, 1972<br>Feynman lectures in physics 1 / R.P. Feynman, R.B. Leighton, M. Sands / Nakladatelství Fragment, 2013<br>Electronic texts of the presentation on the website of the subject Mechanics (1) |       |                                                      |       |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                        |       |                                                      |       |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                             |       |                                                      |       |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 303                                                                                                                                                                                                                                                                                                 |       |                                                      |       |      |      |
| A                                                                                                                                                                                                                                                                                                                                                                         | B     | C                                                    | D     | E    | FX   |
| 32,67                                                                                                                                                                                                                                                                                                                                                                     | 19,14 | 18,48                                                | 15,18 | 5,61 | 8,91 |
| <b>Lecturers:</b> Mgr. Peter Maták, PhD.                                                                                                                                                                                                                                                                                                                                  |       |                                                      |       |      |      |
| <b>Last change:</b> 09.03.2022                                                                                                                                                                                                                                                                                                                                            |       |                                                      |       |      |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                                                                                                                         |       |                                                      |       |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                             |       |                                                      |       |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                           |       |                                                      |       |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                             |       |                                                      |       |      |      |
| <b>Course ID:</b><br>FMFL.KTF/1-FYZ-119/16                                                                                                                                                                                                                                                                                                                                                  |       | <b>Course title:</b><br>Exercises from Mechanics (2) |       |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                              |       |                                                      |       |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                 |       |                                                      |       |      |      |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                                                                                                                             |       |                                                      |       |      |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                |       |                                                      |       |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                       |       |                                                      |       |      |      |
| <b>Course requirements:</b><br>Continuous assessment: papers<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Weight of the intermediate / final evaluation: 100/0<br>Scale of assessment (preliminary/final): Continuous assessment: papersIndicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%Weight of the intermediate / final evaluation: 100/0          |       |                                                      |       |      |      |
| <b>Learning outcomes:</b><br>Mechanics.                                                                                                                                                                                                                                                                                                                                                     |       |                                                      |       |      |      |
| <b>Class syllabus:</b><br>Additional exercise for the subject Mechanics (2). We will practice more simple examples of this subject.                                                                                                                                                                                                                                                         |       |                                                      |       |      |      |
| <b>Recommended literature:</b><br>Physics part 2: Mechanics / D. Halliday, R. Resnick, J. Walker / Brno University of Technology, 2003<br>Physics I. / Dionýz Ilkovič / Bratislava, Alfa, 1972<br>Feynman lectures in physics 1 / R.P. Feynman, R.B. Leighton, M. Sands / Nakladatelství Fragment, 2013<br>Electronic texts of the presentation on the website of the subject Mechanics (2) |       |                                                      |       |      |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                       |       |                                                      |       |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                               |       |                                                      |       |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 209                                                                                                                                                                                                                                                                                                                   |       |                                                      |       |      |      |
| A                                                                                                                                                                                                                                                                                                                                                                                           | B     | C                                                    | D     | E    | FX   |
| 40,67                                                                                                                                                                                                                                                                                                                                                                                       | 22,49 | 17,22                                                | 11,48 | 2,87 | 5,26 |
| <b>Lecturers:</b> Mgr. Peter Maták, PhD.                                                                                                                                                                                                                                                                                                                                                    |       |                                                      |       |      |      |

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|---------------------------------------------------|
| <b>Last change:</b> 09.03.2022                    |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |

## COURSE DESCRIPTION

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------------------------------------------------|-----|-----|-----|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                       |      |                                                     |     |     |     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                     |      |                                                     |     |     |     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                       |      |                                                     |     |     |     |
| <b>Course ID:</b><br>FMFI.KJFB/1-FYZ-401/22                                                                                                                                                                                           |      | <b>Course title:</b><br>Fields of Physical Research |     |     |     |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                           |      |                                                     |     |     |     |
| <b>Number of credits:</b> 2                                                                                                                                                                                                           |      |                                                     |     |     |     |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                       |      |                                                     |     |     |     |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                   |      |                                                     |     |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                 |      |                                                     |     |     |     |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                         |      |                                                     |     |     |     |
| <b>Learning outcomes:</b><br>The student will have an overview of modern research at FMFI UK, which will allow him to decide in which area of physics he wants to continue his master's degree, or to gain a broader view of physics. |      |                                                     |     |     |     |
| <b>Class syllabus:</b><br>Each week a lecture from one of the modern directions of research at the faculty.                                                                                                                           |      |                                                     |     |     |     |
| <b>Recommended literature:</b>                                                                                                                                                                                                        |      |                                                     |     |     |     |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                 |      |                                                     |     |     |     |
| <b>Notes:</b>                                                                                                                                                                                                                         |      |                                                     |     |     |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 256                                                                                                                                                             |      |                                                     |     |     |     |
| A                                                                                                                                                                                                                                     | B    | C                                                   | D   | E   | FX  |
| 98,05                                                                                                                                                                                                                                 | 0,39 | 1,56                                                | 0,0 | 0,0 | 0,0 |
| <b>Lecturers:</b> prof. RNDr. Jozef Masarik, DrSc.                                                                                                                                                                                    |      |                                                     |     |     |     |
| <b>Last change:</b> 24.02.2022                                                                                                                                                                                                        |      |                                                     |     |     |     |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                     |      |                                                     |     |     |     |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                    |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                    |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                    |
| <b>Course ID:</b><br>FMFLKTF/1-FYZ-324/22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Course title:</b><br>Foundations of Meteorology |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 / 2 <b>per level/semester:</b> 52 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                    |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                    |
| <b>Recommended semester:</b> 7.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                    |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                    |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                    |
| <b>Course requirements:</b><br>Ongoing evaluation:<br>Examination: oral / written<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): Weight of the intermediate / final evaluation: 0/100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                    |
| <b>Learning outcomes:</b><br>Gain basic knowledge of atmospheric physics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                    |
| <b>Class syllabus:</b><br>Solar radiation, its transformation in the atmosphere, composition of the atmosphere and its vertical division, radiation balance Earth-atmosphere system, State functions of thermodynamic systems. Dry air thermodynamics. Main thermodynamic theorems. Polytropean story and its specifics. Dry adiabatic. Thermodynamic potentials. Thermodynamics of humid air. Adiabatic events in humid air. Pseudoadiabatic events. Phase diagram. Group heat. Phase change of a thermodynamic system. Water entropy in two and three stages. Introduction of equivalent and humid temperature. Temperature and pressure in the condensate outlet level. Equations of motion for air particles in the atmosphere. Forces in the atmosphere. Distribution of state elements in the atmosphere. Vertical profiles of meteorological elements. Simple atmosphere models. Barometric formula. Vertical stability of the atmosphere, the influence of vertical movements on the stability of the atmosphere. Particle and layer method. Energy of instability. Basic features of general circulation, pressure formations and their genesis, forces acting in these formations. Frontal interface, weather manifestations on atmospheric fronts. Daily and annual course of meteorological elements. Local circulation systems. |                                                    |
| <b>Recommended literature:</b><br>Pechala Frantisek, Bednar Jan: Pracula dynamicke meteorologie. Prague: Academia, 1991<br>Meteorology and Climatology / S.P. Chromov (translated by J. Tomlain) / Vydavatel'stvo SAV Bratislava, 1968, 456 pages                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                    |
| <b>Languages necessary to complete the course:</b><br>Slovak in combination with English (study literature in English)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                    |

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| <b>Notes:</b>                                                                |       |     |     |     |     |
| <b>Past grade distribution</b>                                               |       |     |     |     |     |
| Total number of evaluated students: 1                                        |       |     |     |     |     |
| A                                                                            | B     | C   | D   | E   | FX  |
| 0,0                                                                          | 100,0 | 0,0 | 0,0 | 0,0 | 0,0 |
| <b>Lecturers:</b> doc. RNDr. Martin Gera, PhD., RNDr. Ingrid Damborská, CSc. |       |     |     |     |     |
| <b>Last change:</b> 23.02.2022                                               |       |     |     |     |     |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                            |       |     |     |     |     |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                       |       |                                             |      |     |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                     |       |                                             |      |     |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                       |       |                                             |      |     |      |
| <b>Course ID:</b><br>FMFL.KJP/1-MXX-141/00                                                                                                                                                                                                                            |       | <b>Course title:</b><br>French Language (1) |      |     |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                        |       |                                             |      |     |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                           |       |                                             |      |     |      |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                       |       |                                             |      |     |      |
| <b>Educational level:</b> I., I.II., II.                                                                                                                                                                                                                              |       |                                             |      |     |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                 |       |                                             |      |     |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                         |       |                                             |      |     |      |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                             |       |                                             |      |     |      |
| <b>Class syllabus:</b><br>French language is taught at two levels: beginner and intermediate. Students opt for one of them depending on whether they wish to obtain the fundamentals of the language or wish to maintain and/or improve previous knowledge of French. |       |                                             |      |     |      |
| <b>Recommended literature:</b><br>Capelle Guy, Menand Robert: Le Nouveau taxi 1, Hachette FLE Paris, France 2009, ISBN 978-2-01-155548 - 9                                                                                                                            |       |                                             |      |     |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                    |       |                                             |      |     |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                         |       |                                             |      |     |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 499                                                                                                                                                                                             |       |                                             |      |     |      |
| A                                                                                                                                                                                                                                                                     | B     | C                                           | D    | E   | FX   |
| 48,5                                                                                                                                                                                                                                                                  | 19,44 | 16,63                                       | 7,82 | 2,0 | 5,61 |
| <b>Lecturers:</b> Mgr. Ľubomíra Kožehubová                                                                                                                                                                                                                            |       |                                             |      |     |      |
| <b>Last change:</b> 20.06.2022                                                                                                                                                                                                                                        |       |                                             |      |     |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                     |       |                                             |      |     |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                |       |                                             |      |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                              |       |                                             |      |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                |       |                                             |      |      |      |
| <b>Course ID:</b><br>FMFL.KJP/1-MXX-142/00                                                                                                                                                     |       | <b>Course title:</b><br>French Language (2) |      |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning |       |                                             |      |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                    |       |                                             |      |      |      |
| <b>Recommended semester:</b> 2.                                                                                                                                                                |       |                                             |      |      |      |
| <b>Educational level:</b> I., I.II., II.                                                                                                                                                       |       |                                             |      |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                          |       |                                             |      |      |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                  |       |                                             |      |      |      |
| <b>Learning outcomes:</b>                                                                                                                                                                      |       |                                             |      |      |      |
| <b>Class syllabus:</b><br>The subject continues the program of French language (1) and provides courses of essential and intermediate French language.                                         |       |                                             |      |      |      |
| <b>Recommended literature:</b><br>Capelle Guy, Menand Robert: Le Nouveau taxi 1, Hachette FLE Paris, France 2009, ISBN 978-2-01-155548 - 9                                                     |       |                                             |      |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                             |       |                                             |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                  |       |                                             |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 307                                                                                                                      |       |                                             |      |      |      |
| A                                                                                                                                                                                              | B     | C                                           | D    | E    | FX   |
| 45,6                                                                                                                                                                                           | 22,48 | 16,94                                       | 8,79 | 2,28 | 3,91 |
| <b>Lecturers:</b> Mgr. Ľubomíra Kožehubová                                                                                                                                                     |       |                                             |      |      |      |
| <b>Last change:</b> 20.06.2022                                                                                                                                                                 |       |                                             |      |      |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                              |       |                                             |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                |       |                                             |      |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                              |       |                                             |      |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                |       |                                             |      |      |      |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-241/00                                                                                                                                                     |       | <b>Course title:</b><br>French Language (3) |      |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning |       |                                             |      |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                    |       |                                             |      |      |      |
| <b>Recommended semester:</b> 3.                                                                                                                                                                |       |                                             |      |      |      |
| <b>Educational level:</b> I., I.II., II.                                                                                                                                                       |       |                                             |      |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                          |       |                                             |      |      |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                  |       |                                             |      |      |      |
| <b>Learning outcomes:</b>                                                                                                                                                                      |       |                                             |      |      |      |
| <b>Class syllabus:</b><br>The subject provides a course of intermediate French language, covering not only general, but also technical language.                                               |       |                                             |      |      |      |
| <b>Recommended literature:</b><br>Capelle Guy, Menand Robert: Le Nouveau taxi 1, Hachette FLE Paris, France 2009, ISBN 978-2-01-155548 - 9                                                     |       |                                             |      |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                             |       |                                             |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                  |       |                                             |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 128                                                                                                                      |       |                                             |      |      |      |
| A                                                                                                                                                                                              | B     | C                                           | D    | E    | FX   |
| 48,44                                                                                                                                                                                          | 24,22 | 17,19                                       | 5,47 | 0,78 | 3,91 |
| <b>Lecturers:</b> Mgr. Ľubomíra Kožehubová                                                                                                                                                     |       |                                             |      |      |      |
| <b>Last change:</b> 20.06.2022                                                                                                                                                                 |       |                                             |      |      |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                              |       |                                             |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                       |       |                                             |      |      |     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                     |       |                                             |      |      |     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                       |       |                                             |      |      |     |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-242/00                                                                                                                                                            |       | <b>Course title:</b><br>French Language (4) |      |      |     |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning |       |                                             |      |      |     |
| <b>Number of credits:</b> 2                                                                                                                                                                           |       |                                             |      |      |     |
| <b>Recommended semester:</b> 4.                                                                                                                                                                       |       |                                             |      |      |     |
| <b>Educational level:</b> I., I.II., II.                                                                                                                                                              |       |                                             |      |      |     |
| <b>Prerequisites:</b>                                                                                                                                                                                 |       |                                             |      |      |     |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                         |       |                                             |      |      |     |
| <b>Learning outcomes:</b>                                                                                                                                                                             |       |                                             |      |      |     |
| <b>Class syllabus:</b><br>The subject provides a course of intermediate French covering not only general, but also technical French language.                                                         |       |                                             |      |      |     |
| <b>Recommended literature:</b><br>Menand Robert: Le Nouveau taxi 2, Hachette FLE, Paris, France 2009, ISBN 978-2-01-155551 - 9                                                                        |       |                                             |      |      |     |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                    |       |                                             |      |      |     |
| <b>Notes:</b>                                                                                                                                                                                         |       |                                             |      |      |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 79                                                                                                                              |       |                                             |      |      |     |
| A                                                                                                                                                                                                     | B     | C                                           | D    | E    | FX  |
| 43,04                                                                                                                                                                                                 | 32,91 | 16,46                                       | 2,53 | 1,27 | 3,8 |
| <b>Lecturers:</b> Mgr. Ľubomíra Kožehubová                                                                                                                                                            |       |                                             |      |      |     |
| <b>Last change:</b> 20.06.2022                                                                                                                                                                        |       |                                             |      |      |     |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                     |       |                                             |      |      |     |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                             |                                                     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                           |                                                     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                             |                                                     |
| <b>Course ID:</b><br>FMFI.KDMFI/1-KXX-006/20                                                                                                                                                                                                                                                                                                                                                                                                | <b>Course title:</b><br>Fundamentals of Physics (1) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                    |                                                     |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                     |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                             |                                                     |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                |                                                     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                     |
| <b>Course requirements:</b><br>The assessment consists of two tests, two seminar works and a final exam. Indicative rating scale: A 95%, B 90%, C 80%, D 70%, E 60%. Credits will not be awarded to a student who obtains a grade of less than 60%.<br>Scale of assessment (preliminary/final): 60/40                                                                                                                                       |                                                     |
| <b>Learning outcomes:</b><br>Students will develop skills in using facts, concepts and terminology from the areas listed in the brief course syllabus. They will develop skills to communicate physics information (graph, table, relationship, text) as well as to formulate questions worthy of research and hypotheses of experiments.                                                                                                   |                                                     |
| <b>Class syllabus:</b><br>Deepening and expanding knowledge of high school curricula in the areas of: ideal gas, temperature, kinetic theory of gases; heat conduction, flow and radiation; absolute black body radiation; direct current; energy conservation law and photoelectric effect; energy conservation law and Bernoulli's equation; X-ray absorption and attenuation of light in an optical fiber; periodic phenomena and sound. |                                                     |
| <b>Recommended literature:</b><br>Giancoli, D., Physics: Principles with applications, 6th edition<br>Halliday, D., Resnick, R., Walker, J., Fyzika 1. až 5.,<br>Demkanin, P. a kol. Fyzika pre 2. ročník gymnázia<br>Demkanin, P. a kol. Fyzika pre 3. ročník gymnázia<br>Elektronik materials in moodle.uniba.sk                                                                                                                          |                                                     |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                       |                                                     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                     |

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|-------------------------------------------------------------------------------------|-------|-------|------|-------|-------|
| <b>Past grade distribution</b>                                                      |       |       |      |       |       |
| Total number of evaluated students: 114                                             |       |       |      |       |       |
| A                                                                                   | B     | C     | D    | E     | FX    |
| 27,19                                                                               | 20,18 | 14,91 | 11,4 | 10,53 | 15,79 |
| <b>Lecturers:</b> doc. RNDr. Peter Demkanin, PhD., PaedDr. Tünde Kozánek Kiss, PhD. |       |       |      |       |       |
| <b>Last change:</b> 07.11.2022                                                      |       |       |      |       |       |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                   |       |       |      |       |       |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                     |
| <b>Course ID:</b><br>FMFI.KDMFI/1-KXX-016/20                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Course title:</b><br>Fundamentals of Physics (2) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                            |                                                     |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                     |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                     |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                     |
| <b>Course requirements:</b><br>The assessment consists of two tests, two seminar works and a final exam. Indicative rating scale: A 95%, B 90%, C 80%, D 70%, E 60%. Credits will not be awarded to a student who obtains a grade of less than 60%.<br>Scale of assessment (preliminary/final): 60/40                                                                                                                                                                                               |                                                     |
| <b>Learning outcomes:</b><br>Students will develop skills in using facts, concepts and terminology from the areas listed in the brief course syllabus. They will develop skills to communicate physics information (graph, table, relationship, text) as well as to formulate questions worthy of research and hypotheses of experiments.                                                                                                                                                           |                                                     |
| <b>Class syllabus:</b><br>Deepening and expanding knowledge from high school in the areas of: mechanics of a point mass; Atwood's machine; decomposition of force into components, free body diagram; movement of a point mass in a circle, centrifuge; mechanical work, mechanical energy; application of energy conservation law; the rotational effect of the force and rotation of a rigid body around a fixed axis; fluid mechanics; magnetic and electromagnetic phenomena; basics of optics. |                                                     |
| <b>Recommended literature:</b><br>Giancoli, D., Physics: Principles with applications, 6th edition<br>Halliday, D., Resnick, R., Walker, J., Fyzika 1. až 5.,<br>Demkanin, P. a kol. Fyzika pre 2. ročník gymnázia<br>Demkanin, P. a kol. Fyzika pre 3. ročník gymnázia<br>Elektronick materials in moodle.uniba.sk                                                                                                                                                                                 |                                                     |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                     |

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|------------------------------------------------------------------------------------------|------|------|-------|-------|-------|
| <b>Past grade distribution</b>                                                           |      |      |       |       |       |
| Total number of evaluated students: 56                                                   |      |      |       |       |       |
| A                                                                                        | B    | C    | D     | E     | FX    |
| 25,0                                                                                     | 7,14 | 7,14 | 10,71 | 28,57 | 21,43 |
| <b>Lecturers:</b> doc. PaedDr. Viera Haverlíková, PhD., PaedDr. Tünde Kozánek Kiss, PhD. |      |      |       |       |       |
| <b>Last change:</b> 07.11.2022                                                           |      |      |       |       |       |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                        |      |      |       |       |       |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                     |
| <b>Course ID:</b><br>FMFI.KEF/1-FYZ-212/15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Course title:</b><br>Fundamentals of Programming |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                     |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                     |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                     |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                     |
| <b>Course requirements:</b><br>Exam: practical (programming)<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 0/100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                     |
| <b>Learning outcomes:</b><br>The student will understand the principles of computer processing of numbers and the resulting limitations (data types, including links, number fields). They will understand the basic structures of the program (functions, branches, ...) and their use to algorithmize problem solving. They will be able to program in C / C ++ language simpler algorithms for solving mathematical and physical problems (eg movement in fields, calculation of fields, sums of rows, ...).                                                                                                                                                                                                    |                                                     |
| <b>Class syllabus:</b><br>Basic structure of C / C ++ program, data types and their accuracy, program branching (if..else, switch, for, while, do..while), functions, use of references to return multiple values of functions, two- and multidimensional fields, texts , field references, data flows and their control (cin, cout), working with files (fstream), concept of object, drawing simple graphs from C ++ program (xmgrace, GNUplot), Euler's method for solving differential equations and its use for solving motion problems , roots of functions, numerical integration and its use for solving physical problems, random numbers and Monte Carlo methods, basics of object-oriented programming. |                                                     |
| <b>Recommended literature:</b><br>Kundracik, F .: Basics of Programming Practically. Vydavateľstvo UK 2013. On-line: <a href="http://www.fmph.uniba.sk/index.php?id=3246">http://www.fmph.uniba.sk/index.php?id=3246</a><br>Materials on the course page: <a href="http://davinci.fmph.uniba.sk/~kundracik1/ZakladyProgramovania/">http://davinci.fmph.uniba.sk/~kundracik1/ZakladyProgramovania/</a>                                                                                                                                                                                                                                                                                                              |                                                     |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                     |

|                                                                                      |      |       |      |      |      |
|--------------------------------------------------------------------------------------|------|-------|------|------|------|
| <b>Past grade distribution</b>                                                       |      |       |      |      |      |
| Total number of evaluated students: 410                                              |      |       |      |      |      |
| A                                                                                    | B    | C     | D    | E    | FX   |
| 59,27                                                                                | 6,83 | 10,49 | 9,27 | 8,54 | 5,61 |
| <b>Lecturers:</b> doc. RNDr. František Kunderacik, CSc., doc. RNDr. Peter Papp, PhD. |      |       |      |      |      |
| <b>Last change:</b> 24.06.2022                                                       |      |       |      |      |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                    |      |       |      |      |      |

## COURSE DESCRIPTION

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------------------------------------------------|-----|------|------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                      |      |                                                         |     |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                    |      |                                                         |     |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                      |      |                                                         |     |      |      |
| <b>Course ID:</b><br>FMFI.KAI+KDMFI/1-KXX-008/20                                                                                                                                                                                                                                                                                                                     |      | <b>Course title:</b><br>Fundamentals of Programming (1) |     |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> course<br><b>Number of hours:</b><br><b>per week:</b> 4 <b>per level/semester:</b> 52<br><b>Form of the course:</b> on-site learning                                                                                                                                                                    |      |                                                         |     |      |      |
| <b>Number of credits:</b> 6                                                                                                                                                                                                                                                                                                                                          |      |                                                         |     |      |      |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                      |      |                                                         |     |      |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                         |      |                                                         |     |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                |      |                                                         |     |      |      |
| <b>Antirequisites:</b> FMFI.KAI+KDMFI/1-KXX-020/25                                                                                                                                                                                                                                                                                                                   |      |                                                         |     |      |      |
| <b>Course requirements:</b><br>Continuous assessment: homework, tests<br>Exam: solving computer tasks<br>It is necessary to obtain at least 90% of points to obtain A rating, at least 80% of points to grade B, at least 70% of points to grade C, at least 60% of points to grade D and at least 50% to grade E.<br>Scale of assessment (preliminary/final): 70/30 |      |                                                         |     |      |      |
| <b>Learning outcomes:</b><br>After completing the course, students will be able to write short, simple programs in Python and master the basic methods of debugging in their own programs.                                                                                                                                                                           |      |                                                         |     |      |      |
| <b>Class syllabus:</b><br>Basic Python program structures: cycles, conditions, variables, functions, strings, files. Basic methods of finding errors in programs.                                                                                                                                                                                                    |      |                                                         |     |      |      |
| <b>Recommended literature:</b><br>Python programming : An introduction to computer science / John M. Zelle. Sherwood, Or. : Franklin, Beedle & Associates, 2010                                                                                                                                                                                                      |      |                                                         |     |      |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                |      |                                                         |     |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                        |      |                                                         |     |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 115                                                                                                                                                                                                                                                                                            |      |                                                         |     |      |      |
| A                                                                                                                                                                                                                                                                                                                                                                    | B    | C                                                       | D   | E    | FX   |
| 89,57                                                                                                                                                                                                                                                                                                                                                                | 1,74 | 2,61                                                    | 0,0 | 3,48 | 2,61 |
| <b>Lecturers:</b> RNDr. Michal Winczer, PhD.                                                                                                                                                                                                                                                                                                                         |      |                                                         |     |      |      |

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| <b>Last change:</b> 15.03.2022                    |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                              |                                                         |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                            |                                                         |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                              |                                                         |
| <b>Course ID:</b><br>FMFI.KAI+KDMFI/1-KXX-018/20                                                                                                                                                                                                                                                                                                                             | <b>Course title:</b><br>Fundamentals of Programming (2) |
| <b>Educational activities:</b><br><b>Type of activities:</b> course<br><b>Number of hours:</b><br><b>per week:</b> 4 <b>per level/semester:</b> 52<br><b>Form of the course:</b> on-site learning                                                                                                                                                                            |                                                         |
| <b>Number of credits:</b> 6                                                                                                                                                                                                                                                                                                                                                  |                                                         |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                              |                                                         |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                 |                                                         |
| <b>Prerequisites:</b> (FMFI.KAI+KDMFI/1-KXX-008/20 - Fundamentals of Programming (1) or FMFI.KAI+KDMFI/1-KXX-020/25 - Fundamentals of Programming (1))                                                                                                                                                                                                                       |                                                         |
| <b>Antirequisites:</b> FMFI.KAI+KDMFI/1-KXX-021/25                                                                                                                                                                                                                                                                                                                           |                                                         |
| <b>Course requirements:</b><br>Continuous assessment: homework, written tests<br>Exam: solving computer tasks<br>It is necessary to obtain at least 90% of points to obtain A rating, at least 80% of points to grade B, at least 70% of points to grade C, at least 60% of points to grade D and at least 50% to grade E.<br>Scale of assessment (preliminary/final): 70/30 |                                                         |
| <b>Learning outcomes:</b><br>Students will get acquainted with the basic structures for storing data in Python. Through motivational examples, they will improve in writing and debugging simple programs and get acquainted with the basic principles of computer science.                                                                                                  |                                                         |
| <b>Class syllabus:</b><br>Advanced structures in Python (lists, n-tuples, matrices). Debugging programs. Motivational examples illustrating basic concepts of informatics. Examples of practical applications.                                                                                                                                                               |                                                         |
| <b>Recommended literature:</b><br>Python 3 : Výukový kurz / Mark Summerfield ; překlad Lukáš Krejčí. Brno : Computer Press, 2010<br>Sedem divov informatiky / Juraj Hromkovič ; preklad Michal Winczer. Ružomberok : Verbum, 2012                                                                                                                                            |                                                         |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                        |                                                         |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                |                                                         |

|                                                   |      |      |      |     |      |
|---------------------------------------------------|------|------|------|-----|------|
| <b>Past grade distribution</b>                    |      |      |      |     |      |
| Total number of evaluated students: 67            |      |      |      |     |      |
| A                                                 | B    | C    | D    | E   | FX   |
| 85,07                                             | 2,99 | 7,46 | 1,49 | 0,0 | 2,99 |
| <b>Lecturers:</b> RNDr. Michal Winczer, PhD.      |      |      |      |     |      |
| <b>Last change:</b> 15.03.2022                    |      |      |      |     |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |      |      |      |     |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                             |      |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                             |      |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                    |       |                                             |      |      |      |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-151/00                                                                                                                                                                                                                                                                                                                                                                                                         |       | <b>Course title:</b><br>German Language (1) |      |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                     |       |                                             |      |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                             |      |      |      |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                             |      |      |      |
| <b>Educational level:</b> I., I.II., II.                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                             |      |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                             |      |      |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                      |       |                                             |      |      |      |
| <b>Learning outcomes:</b><br>To master the fundamentals of the common language and basic technical terms of particular fields of study (depending on the student's level of German proficiency )                                                                                                                                                                                                                                                   |       |                                             |      |      |      |
| <b>Class syllabus:</b><br>German language is taught at three levels: beginner, intermediate and advanced. Students opt for one of them depending on whether they need to learn the fundamentals or maintain and/or improve their previous knowledge.<br>This course's focus is to master the fundamentals of the common language and basic technical terms of particular fields of study (depending on the student's level of German proficiency ) |       |                                             |      |      |      |
| <b>Recommended literature:</b><br>Appropriate study material is supplied by teacher based on the participants'level of German proficiency.                                                                                                                                                                                                                                                                                                         |       |                                             |      |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                             |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                             |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 874                                                                                                                                                                                                                                                                                                                                                                          |       |                                             |      |      |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                  | B     | C                                           | D    | E    | FX   |
| 38,33                                                                                                                                                                                                                                                                                                                                                                                                                                              | 24,71 | 18,42                                       | 8,81 | 2,86 | 6,86 |
| <b>Lecturers:</b> Mgr. Alexandra Maďarová, Mgr. Simona Dobiašová, PhD.                                                                                                                                                                                                                                                                                                                                                                             |       |                                             |      |      |      |
| <b>Last change:</b> 05.09.2025                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                             |      |      |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                             |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                             |       |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                             |       |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                             |       |      |      |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-152/00                                                                                                                                                                                                                                                                                                                                                                                                                             |       | <b>Course title:</b><br>German Language (2) |       |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                         |       |                                             |       |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                             |       |      |      |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                             |       |      |      |
| <b>Educational level:</b> I., I.II., II.                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                             |       |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                             |       |      |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                          |       |                                             |       |      |      |
| <b>Learning outcomes:</b><br>To master the fundamentals of the common language and basic technical terms of particular fields of study (depending on the student's level of German proficiency )                                                                                                                                                                                                                                                                       |       |                                             |       |      |      |
| <b>Class syllabus:</b><br>German language is taught at two levels: beginner and intermediate. Students opt for one of them depending on whether they wish to obtain the fundamentals of the language or wish to maintain and/or improve previous knowledge of German.<br>This course’s focus is to to master the fundamentals of the common language and basic technical terms of particular fields of study (depending on the student's level of German proficiency ) |       |                                             |       |      |      |
| <b>Recommended literature:</b><br>Appropriate study material is supplied by teacher based on the participants’level of German proficiency                                                                                                                                                                                                                                                                                                                              |       |                                             |       |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                             |       |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                             |       |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 542                                                                                                                                                                                                                                                                                                                                                                                              |       |                                             |       |      |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | B     | C                                           | D     | E    | FX   |
| 38,01                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 19,56 | 19,56                                       | 12,36 | 3,51 | 7,01 |
| <b>Lecturers:</b> Mgr. Alexandra Maďarová, Mgr. Simona Dobiašová, PhD.                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                             |       |      |      |
| <b>Last change:</b> 05.09.2025                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                             |       |      |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                             |       |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                         |       |                                             |      |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                       |       |                                             |      |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                         |       |                                             |      |      |      |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-251/00                                                                                                                                                                                                                                                                                                              |       | <b>Course title:</b><br>German Language (3) |      |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                   |       |                                             |      |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                             |       |                                             |      |      |      |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                                         |       |                                             |      |      |      |
| <b>Educational level:</b> I., I.II., II.                                                                                                                                                                                                                                                                                                                |       |                                             |      |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                   |       |                                             |      |      |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                           |       |                                             |      |      |      |
| <b>Learning outcomes:</b><br>Master the basics of general language and basic professional terminology of individual fields of study (depending on the advanced level of students)                                                                                                                                                                       |       |                                             |      |      |      |
| <b>Class syllabus:</b><br>The course is a follow-up to the German language (1,2). The subject provides a course of intermediate or advanced German language.<br>This course's focus is to deepen the knowledge of the common language and basic technical terms of particular fields of study (depending on the student's level of German proficiency). |       |                                             |      |      |      |
| <b>Recommended literature:</b><br>Appropriate study material is supplied by teacher based on the participants' level of German proficiency.                                                                                                                                                                                                             |       |                                             |      |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                      |       |                                             |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                           |       |                                             |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 191                                                                                                                                                                                                                                                                               |       |                                             |      |      |      |
| A                                                                                                                                                                                                                                                                                                                                                       | B     | C                                           | D    | E    | FX   |
| 45,03                                                                                                                                                                                                                                                                                                                                                   | 23,04 | 19,37                                       | 6,81 | 2,09 | 3,66 |
| <b>Lecturers:</b> Mgr. Alexandra Maďarová, Mgr. Simona Dobiašová, PhD.                                                                                                                                                                                                                                                                                  |       |                                             |      |      |      |
| <b>Last change:</b> 05.09.2025                                                                                                                                                                                                                                                                                                                          |       |                                             |      |      |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                                                                                                       |       |                                             |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                 |       |                                             |       |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                               |       |                                             |       |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                 |       |                                             |       |      |      |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-252/00                                                                                                                                                                                                                                                                                                      |       | <b>Course title:</b><br>German Language (4) |       |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                  |       |                                             |       |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                     |       |                                             |       |      |      |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                                                                                 |       |                                             |       |      |      |
| <b>Educational level:</b> I., I.II., II.                                                                                                                                                                                                                                                                                                        |       |                                             |       |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                           |       |                                             |       |      |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                   |       |                                             |       |      |      |
| <b>Learning outcomes:</b><br>Master the basics of general language and basic professional terminology of individual fields of study (depending on the advanced level of students)                                                                                                                                                               |       |                                             |       |      |      |
| <b>Class syllabus:</b><br>The course is a follow-up to the German language (1-3). It provides a course of intermediate and advanced German language.<br>This course's focus is to deepen the knowledge of the common language and basic technical terms of particular fields of study (depending on the student's level of German proficiency). |       |                                             |       |      |      |
| <b>Recommended literature:</b><br>Appropriate study material is supplied by teacher based on the participants' level of German proficiency.                                                                                                                                                                                                     |       |                                             |       |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                              |       |                                             |       |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                   |       |                                             |       |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 104                                                                                                                                                                                                                                                                       |       |                                             |       |      |      |
| A                                                                                                                                                                                                                                                                                                                                               | B     | C                                           | D     | E    | FX   |
| 44,23                                                                                                                                                                                                                                                                                                                                           | 22,12 | 14,42                                       | 10,58 | 3,85 | 4,81 |
| <b>Lecturers:</b> Mgr. Alexandra Maďarová, Mgr. Simona Dobiašová, PhD.                                                                                                                                                                                                                                                                          |       |                                             |       |      |      |
| <b>Last change:</b> 05.09.2025                                                                                                                                                                                                                                                                                                                  |       |                                             |       |      |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                                                                                               |       |                                             |       |      |      |

## COURSE DESCRIPTION

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                   |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                   |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                   |
| <b>Course ID:</b><br>FMFI.KAFZM/1-FYZ-453/22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Course title:</b><br>High Performance Computing for Physicists |
| <b>Educational activities:</b><br><b>Type of activities:</b> course<br><b>Number of hours:</b><br><b>per week: 3 per level/semester: 39</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                   |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                   |
| <b>Recommended semester:</b> 7.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                   |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                   |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                   |
| <b>Course requirements:</b><br>Interim evaluation: elaboration of tasks<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                   |
| <b>Learning outcomes:</b><br>The student will acquire basic knowledge and skills in the field of high-performance computing and parallel programming.                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                   |
| <b>Class syllabus:</b><br>Linux/Unix, scripting. Command interpreters, shell, remote access.<br>Computer architectures, sequential, vector, shared and distributed memory, symmetrical and asymmetric multiprocessing, NUMA, ccNUMA, GPU architecture. Grid.<br>Parallel programming models, Message Passing Interface (MPI), Application Program Interface (OpenMP). Basics of MPI, MPI implementation, OpenMP basics. GPU programming (CUDA).<br>Examples of high-performance computing.                                                                                                   |                                                                   |
| <b>Recommended literature:</b><br>William Gropp, Ewing Lusk, Anthony Skjellum: Using MPI: Portable Parallel Programming with the Message-Passing Interface, MIT Press, 2014.<br>Chapman, Barbara; Jost, Gabriele, Pas, Ruud van der: Using OpenMP: portable shared memory parallel programming, MIT Press, 2008.<br>Richard Blum; Christine Bresnahan: Linux Command Line and Shell Scripting Bible, Wiley, 2021.<br>Jaegeun Han, Bharatkumar Sharma: Learn CUDA Programming: A beginner's guide to GPU programming and parallel computing with CUDA 10.x and C/C++, Packt Publishing, 2019. |                                                                   |
| <b>Languages necessary to complete the course:</b><br>SK, EN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                   |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                   |

|                                                   |     |     |     |     |     |
|---------------------------------------------------|-----|-----|-----|-----|-----|
| <b>Past grade distribution</b>                    |     |     |     |     |     |
| Total number of evaluated students: 14            |     |     |     |     |     |
| A                                                 | B   | C   | D   | E   | FX  |
| 100,0                                             | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 |
| <b>Lecturers:</b> doc. Mgr. Jozef Kristek, DrSc.  |     |     |     |     |     |
| <b>Last change:</b> 06.05.2022                    |     |     |     |     |     |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |     |     |     |     |     |

## COURSE DESCRIPTION

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                      |
| <b>Course ID:</b><br>FMFI.KAI/1-MXX-491/22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Course title:</b><br>Inclusive Approaches to Education of Students with Special Educational Needs |
| <b>Educational activities:</b><br><b>Type of activities:</b> seminar<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                      |
| <b>Recommended semester:</b> 1., 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                      |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                      |
| <b>Course requirements:</b><br>Continuous assessment: active participation in class (elaboration of assigned tasks, participation in discussions)<br>An exam: -<br>Indicative assessment level: e.g. A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                      |
| <b>Learning outcomes:</b><br>The student: <ul style="list-style-type: none"> <li>- They will get acquainted with the basic characteristics of types of health disadvantage (HR) and will know the consequences of HR on education.</li> <li>- Gain personal experience from meetings with people with disabilities and will be able to explain and apply the rules of communication with them.</li> <li>- Can characterize the forms of education of students with SEN and assess the possibilities of their pedagogical, technical and human support, which positively affect the success of education.</li> </ul>                                                                                          |                                                                                                      |
| <b>Class syllabus:</b> <ul style="list-style-type: none"> <li>- Characteristics of basic concepts.</li> <li>- Disability models.</li> <li>- Disability legislation.</li> <li>- Human, communication, information and architectural barriers.</li> <li>- Impact of disability on education.</li> <li>- Segregation - integration - inclusion.</li> <li>- Information access technologies for people with disabilities.</li> <li>- Possibilities and limits of creating equal conditions for the education of pupils with specific educational needs.</li> <li>- Inclusive school - education for all.</li> <li>- The importance of education for the social inclusion of people with disabilities.</li> </ul> |                                                                                                      |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                      |

- Lechta, V. (ed): Inkluzivní pedagogika. Praha: Portál, 2016, ISBN 978-80-262-1123-5
- Slowík, J.: Komunikace s lidmi a postižením. Praha: Portál, 2010, ISBN 978-80-7367-691-9
- Kol. autorov: Od integrácie k inklúzii. VÚDPaP: Bratislava, 2018, ISBN 978-80-89698-27-1

**Languages necessary to complete the course:**

Slovak

**Notes:**

**Past grade distribution**

Total number of evaluated students: 124

| A     | B     | C    | D   | E   | FX   |
|-------|-------|------|-----|-----|------|
| 76,61 | 17,74 | 4,03 | 0,0 | 0,0 | 1,61 |

**Lecturers:** Mgr. Ľudmila Hlinová

**Last change:** 15.03.2022

**Approved by:** doc. RNDr. Tomáš Blažek, PhD.

## COURSE DESCRIPTION

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                    |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                    |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                    |
| <b>Course ID:</b><br>FMFI.KJFB/1-BMF-311/15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Course title:</b><br>Introduction to Biophysics |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 / 2 <b>per level/semester:</b> 52 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                    |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                    |
| <b>Recommended semester:</b> 7.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                    |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                    |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                    |
| <b>Course requirements:</b><br>Preliminary evaluation: solving examples<br>Final exam: oral / written exam<br>Indicative evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 20/80                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                    |
| <b>Learning outcomes:</b><br>To show the students how the processes taking place in living organisms can be explained using physics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                    |
| <b>Class syllabus:</b><br>Structure and physical properties of biopolymers - nucleic acids, proteins and polysaccharides. DNA discovery, genes. Biological membranes - structure and function. Physics of nerve impulse generation and generation. Biomechanics, elasticity of biomaterials. Physics of respiration. Physics of blood circulation, space medicine. Biological optics, thermovision. Biological acoustics. Orientation of animals in electromagnetic fields and using ultrasound. Thermodynamics, bioenergetics. Molecular machines and nanobiotechnology. Evolution. Modern physical methods in biophysical research.<br>Solving physical examples associated with the mechanisms of processes in living organisms. |                                                    |
| <b>Recommended literature:</b><br>Biophysics : An introduction / Roland Glaser. Heidelberg : Springer, 2012<br>Biomedical applications of introductory physics / Jack A. Tuszynski, John M. Dixon. Hoboken, N.J. : Wiley, 2002<br>Elementary biophysics : An introduction / P K Srivastava. Harrow : Alpha Science International, 2005                                                                                                                                                                                                                                                                                                                                                                                              |                                                    |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                    |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                    |

|                                                                                                              |       |     |     |      |      |
|--------------------------------------------------------------------------------------------------------------|-------|-----|-----|------|------|
| <b>Past grade distribution</b>                                                                               |       |     |     |      |      |
| Total number of evaluated students: 35                                                                       |       |     |     |      |      |
| A                                                                                                            | B     | C   | D   | E    | FX   |
| 65,71                                                                                                        | 22,86 | 0,0 | 0,0 | 2,86 | 8,57 |
| <b>Lecturers:</b> prof. RNDr. Tibor Hianik, DrSc., Mgr. Zuzana Garaiová, PhD., Mgr. Veronika Šubjaková, PhD. |       |     |     |      |      |
| <b>Last change:</b> 22.06.2022                                                                               |       |     |     |      |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                            |       |     |     |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                        |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                        |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                        |
| <b>Course ID:</b><br>FMFI.KEF/1-FYZ-231/22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Course title:</b><br>Introduction to Modern Physics |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 / 2 <b>per level/semester:</b> 52 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                        |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                        |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                        |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                        |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                        |
| <b>Course requirements:</b><br>Continuous assessment: homeworks, written tests<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 40/60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |
| <b>Learning outcomes:</b><br>Basic knowledge of quantum theory, understanding its genesis based on physical experiments. Understanding simple quantum models and phenomena and their application in describing the structure, stability and physical properties of basic quantum structures: atomic nuclei, atoms and molecules.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                        |
| <b>Class syllabus:</b> <ol style="list-style-type: none"> <li>1. Experiments leading to quantization of electromagnetic field. Photon and its basic properties. Basic physical constants. Physical scales: energy, space, time.</li> <li>2. Electron: discovery of an electron, Millikan's experiment. Electron diffraction (Davisson-Germer experiment). Atomic nucleus: Rutherford's experiment. Classical models of the atom and their failures.</li> <li>3. Spectral series of a hydrogen atom. Bohr model of the atom. Correspondence principle Spin and magnetic moment of elementary particles</li> <li>4. Wave function, its physical interpretation. Quantum states: bound (<math>E &lt; 0</math>), free (<math>E &gt; 0</math>). Quantum particle diffraction - Young's experiment</li> <li>5. Simple quantum systems: Potential pit, infinite, finite. Harmonic oscillator. The particle transition through the final potential barrier. Quantum particle tunneling. Alpha-decay of nuclei.</li> <li>6. Orbital momentum, Quantization of momentum and spin.</li> <li>7. Hydrogen atom, eigenstates, degeneration of energy levels. Spectrum corrections: Zeeman phenomenon, Spin, Stern-Gerlach experiment</li> <li>8. Multielectron atoms. occupancy of energy levels, Periodic table of elements Atomic spectra, selection rules. X-ray generation, Moseley's law.</li> <li>9. Double hole potential. Hydrogen molecule ion. Two-state quantum system: ammonia, benzene nucleus, organic molecules spin in a magnetic field. NMR, laser.</li> </ol> |                                                        |

10. Molecules: bond between atoms. Rotational spectra and vibrational spectra of molecules. Heat capacity of crystals - phonons.
11. Atomic nucleus. : size, weight, composition. Neutron: properties, stability. Yukawa's model of strong interaction.
12. Binding energy. Core stability. Nuclear models: deuteron, drip nuclear model. Nuclear magnetic moment, NMR.
13. Beta-decay, inverse beta-decay, neutrino. Alpha-decay, radioactive advice. Nuclear transformations in nature, dating. Radioactivity
14. Nuclear fission. Nuclear fusion: proton-proton and carbon cycle.
15. Overview of elementary particles.

**Recommended literature:**

- R. Serway, C. J. Moses, C. A. Moyer: Modern Physics. Saunders College Publishing 1997
- A. Beiser: Introduction to Modern Physics. 1976 Academy
  - P. Markoš: Modern Physics (scripts) STU Bratislava Publishing House 2012
  - Feynman's lectures in physics, part 3 (published in English, Russian, Slovak and Czech)
  - E. H. Wichman: Quantum Physics (Berkeley Physics Course vol. 3)
  - D. Halliday, R. Resnick, J. Walker: Physics Brno University of Technology, ed. VUTIUM and PROMETHEUS 2006
  - J. Pišút, L. Gomolčák, V. Černý: Introduction to quantum mechanics.
  - J. Pišút V. Černý P. Prešnajder: Collection of problems in quantum mechanics. Alpha / SNTL, 1985
  - A. F. J. Levi: Applied Quantum Mechanics, 2nd ed. Cambridge Univ. Press, 2006
  - E. Merzbacher: Quantum Mechanics, 3rd ed. Jon Willey & Sons, 1998

**Languages necessary to complete the course:**

Slovak, English

**Notes:**

**Past grade distribution**

Total number of evaluated students: 227

| A     | B     | C     | D    | E     | FX   |
|-------|-------|-------|------|-------|------|
| 32,16 | 15,42 | 17,62 | 14,1 | 11,01 | 9,69 |

**Lecturers:** Mgr. Pavol Neilinger, PhD., prof. RNDr. Miroslav Grajcar, DrSc.

**Last change:** 08.03.2022

**Approved by:** doc. RNDr. Tomáš Blažek, PhD.

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                  |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                  |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                  |
| <b>Course ID:</b><br>FMFI.KEF/1-FYZ-451/15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Course title:</b><br>Introduction to Plasma Physics and Electrical Discharges |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 / 2 <b>per level/semester:</b> 52 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                  |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                  |
| <b>Recommended semester:</b> 8.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                  |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                  |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                  |
| <b>Course requirements:</b><br>Continuous assessment: no<br>Final: test, exam<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 0/100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                  |
| <b>Learning outcomes:</b><br>In the course, students will gain basic knowledge of plasma physics and electrical discharges, which are necessary for successful completion of the bachelor's thesis in the area. After completing the course, students will be able to easily orient themselves in the studied issues, as they will have basic knowledge about plasma, its occurrence, generation methods, mechanisms of electric discharges, their application and plasma diagnostics. Upon successful completion of the course, students will be knowledge-ready for a possible master's degree in Plasma Physics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                  |
| <b>Class syllabus:</b> <ol style="list-style-type: none"> <li>1. Plasma - 4th state of matter, natural occurrence of plasma, "quasineutrality" of ionized gas, methods of plasma generation (various types of electric discharges in gases), application of glow, corona and arc discharges.</li> <li>2. Debye-Hückel theory of charge shielding: collective phenomena of particles, plasma polarization, shielding of el. field of inserted charge, shielded potential, Debye length, Debye sphere - ideal, non-ideal plasma.</li> <li>3. Plasma charge fluctuation, quasi-neutrality of plasma, exact definition of plasma; plasma oscillations, plasma frequency.</li> <li>4. Elastic and inelastic collisions of particles in plasma, mean free path of gas particles, collision frequency, effective collision cross section, reaction coefficient, elementary processes in plasma.</li> <li>5. Excitation and ionization by electron-ion interaction, differential ionization, particle ionization collision cross section; radiation ionization and excitation, resonant radiation, diffusion of radiation, radiation absorption, effective photon collision cross section; thermal ionization and excitation, degree of ionization, Saha equation, binary gas, degree of excitation and Boltzmann's law.</li> <li>6. Dissociative ionization, Townsend (first) ionization coefficient, ionization function, Wannier equation; negative ion formation, electron affinity, electronegative and electropositive gases,</li> </ol> |                                                                                  |

dissociative attachment, three-particles attachment, transient negative ion (TNI); reaction coefficient, reduced el. field.

7. Particle recombination - spatial, on electrodes, on the wall (conductive, non-conductive); negative ion extinction; spatial recombination, recombination factor of electrons with positive ions.

8. The movement of particles in el. field (drift), charged particle mobility, drift velocity; particle motion under the influence of concentration gradient (diffusion), Fick's law, Einstein's relation; Ambipolar diffusion.

9. Statistical theory of el. discharges, statistical model of electron avalanches, statistical model of el. discharges.

10. Streamer concept, Boltzman kinetic equation and Monte Carlo method.

11. El. Discharges at high pressure, corona discharge, corona discharge in applied electrostatics, primary and secondary streamer.

12. Dielectric barrier discharges, glow discharges at atmospheric pressure, surface activations of polymeric materials in various types of el. discharges.

13. Spark and arc discharge, el. discharges in liquids.

14. Plasma diagnostics, single and double probe (determination of electron concentration and temperature), optical emission spectroscopy, atomic spectra (determination of electron temperature from the ratio of intensity of spectral lines), molecular spectra (determination of rotational temperature spectra), actinometry, laser absorption spectroscopy, corpuscular spectroscopy, CRDS spectroscopy.

15. Examples of plasma application use: in metallurgy, in surface treatment of materials, environmental protection, light sources, thermonuclear fusion.

During the practical part of subject, computational tasks on the topic will be solved and additional (time-consuming) mathematical definitions of some physical relations and laws of lectures will be performed. Students will gain and acquire knowledge of the basics of modeling in plasma physics, and within the demonstration experiments of individual electric discharges, they will actually get acquainted with the instrumentation of laboratories. They will also get acquainted with diagnostic methods used in plasma physics - optical emission spectroscopy, probe methods, microwave methods, mass spectroscopy.

#### **Recommended literature:**

Základy fyziky plazmy : Učebný text pre magisterské štúdium / Viktor Martišovitš.  
Bratislava:Univerzita Komenského, 2006  
Fundamentals of plasma physics / J. A. Bittencourt. New York: Springer, 2004  
Basic plasma physics: Selected chapters. Handbook of plasma physics. Volumes 1 and 2 / editors A. A. Galeev, R. N. Sudan. Amsterdam: North-Holland, 1989

#### **Languages necessary to complete the course:**

Slovak, English

#### **Notes:**

#### **Past grade distribution**

Total number of evaluated students: 40

| A    | B    | C    | D    | E   | FX  |
|------|------|------|------|-----|-----|
| 50,0 | 30,0 | 10,0 | 10,0 | 0,0 | 0,0 |

**Lecturers:** doc. Mgr. Dušan Kováčik, PhD., doc. RNDr. Mário Janda, PhD.

**Last change:** 09.03.2022

**Approved by:** doc. RNDr. Tomáš Blažek, PhD.

## COURSE DESCRIPTION

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                             |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                             |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                             |
| <b>Course ID:</b><br>FMFI.KEF/1-FYZ-452/22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Course title:</b><br>Introduction to Solid State Physics |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 / 2 <b>per level/semester:</b> 52 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                             |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                             |
| <b>Recommended semester:</b> 8.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                             |
| <b>Educational level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                             |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                             |
| <b>Antirequisites:</b> FMFI.KEF/1-FYZ-452/18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                             |
| <b>Course requirements:</b><br>Continuous assessment: homework, 2 papers<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): Weight of the intermediate / final evaluation: 100/0                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                             |
| <b>Learning outcomes:</b><br>After completing the course, students will be actively acquainted with the following basic concepts of solid state physics: ideal crystal, reciprocal space, phonon spectrum, electron band structure and Fermi surface. They will also know how these concepts enter into the simplest analyzes of the thermal, electrical and optical properties of solids.                                                                                                                                                                                                                                                                                            |                                                             |
| <b>Class syllabus:</b><br>Symmetry classification of substances. Van der Waals-London bond. Liquid-gas transition. Crystals with van der Waals and ionic bonding. Basics of crystallography. Surface tension and nucleation. Diffraction experiments and reciprocal space. Classical and quantum lattice oscillations theory. Metal binding. Chemical bonding. Electron spectrum in an ideal crystal: tight bond method, Bloch's theorem, difference between metals and insulators. Transport phenomena: phenomenological description, Boltzmann's equation. Semiconductors and semiconductor electronics. Response to time-varying fields. Elementary models of dielectric function. |                                                             |
| <b>Recommended literature:</b><br><a href="http://www.st.fmph.uniba.sk/~hlubina1/">http://www.st.fmph.uniba.sk/~hlubina1/</a><br>Condensed matter physics : Corrected printing / Michael P. Marder. John Wiley, 2000<br>Solid-State Physics / H. Ibach, H. Lüth. Springer, 2003<br>Úvod do fyziky pevných látek / Charles Kittel. Academia, 1985                                                                                                                                                                                                                                                                                                                                      |                                                             |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                             |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                             |

|                                                                                  |       |      |     |       |      |
|----------------------------------------------------------------------------------|-------|------|-----|-------|------|
| <b>Past grade distribution</b>                                                   |       |      |     |       |      |
| Total number of evaluated students: 15                                           |       |      |     |       |      |
| A                                                                                | B     | C    | D   | E     | FX   |
| 46,67                                                                            | 13,33 | 6,67 | 0,0 | 26,67 | 6,67 |
| <b>Lecturers:</b> doc. RNDr. Richard Hlubina, DrSc., Mgr. František Herman, PhD. |       |      |     |       |      |
| <b>Last change:</b> 24.02.2022                                                   |       |      |     |       |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                |       |      |     |       |      |

## COURSE DESCRIPTION

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                          |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                          |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                          |
| <b>Course ID:</b><br>FMFI.KDMFI/1-AIN-112/22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Course title:</b><br>Introduction to Web Technologies |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                          |
| <b>Number of credits:</b> 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                          |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                          |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                          |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                          |
| <b>Antirequisites:</b> FMFI.KZVI/1-AIN-610/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                          |
| <b>Course requirements:</b><br>Intermediate assessment: practical assignments<br>Exam: practical (at least 70% of the semester points are needed)<br>Indicative evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 20/80                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                          |
| <b>Learning outcomes:</b><br>After completing the course, students will be able to create a correct web page (in HTML) with the correct structure and correctly formatted content. The design will be implemented using CSS and will be adapted to different devices (using MediaQueries or CSS framework). The pages will fulfil the basic conditions of accessibility for people with special needs.<br>Students will be introduced to the basics of JavaScript, which will allow them to work with HTML elements, edit CSS and work with forms.                                                                                                                                              |                                                          |
| <b>Class syllabus:</b><br>- HTML: document structuring, content formatting elements, basic page elements including multimedia objects, code validation, tables, forms and their appropriate structuring.<br>- Cascading Style Sheets (CSS): properties and their values, selectors, pseudo-classes, properties for formatting fonts and text, tables and other objects, colors, backgrounds, lengths, units, box model, object placement, visual document formatting, styles for different devices, Media Queries, other CSS options with respect to current versions.<br>- Introduction to CSS frameworks, e.g. Bootstrap + responsive pages.<br>- Basic information on website accessibility. |                                                          |
| <b>Recommended literature:</b><br>actual documentation for each technology<br>w3schools.com<br>own electronic texts published on the website or in the Moodle environment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                          |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                          |

|                                                   |       |       |       |       |       |
|---------------------------------------------------|-------|-------|-------|-------|-------|
| Slovak, English                                   |       |       |       |       |       |
| <b>Notes:</b>                                     |       |       |       |       |       |
| <b>Past grade distribution</b>                    |       |       |       |       |       |
| Total number of evaluated students: 1754          |       |       |       |       |       |
| A                                                 | B     | C     | D     | E     | FX    |
| 31,87                                             | 11,29 | 11,97 | 13,85 | 12,03 | 18,99 |
| <b>Lecturers:</b> PaedDr. Roman Hrušecký, PhD.    |       |       |       |       |       |
| <b>Last change:</b> 21.06.2022                    |       |       |       |       |       |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |       |       |       |       |       |

## COURSE DESCRIPTION

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                        |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                        |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                        |
| <b>Course ID:</b><br>FMFI.KEF+KAFZM/1-FYZ-807/22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Course title:</b><br>Introduction to optical and laser spectroscopy |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 1 <b>per level/semester:</b> 26 / 13<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                        |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                        |
| <b>Recommended semester:</b> 8.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                        |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                        |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                        |
| <b>Recommended prerequisites:</b><br>1-FYZ-218/22 Optics (Physics 2/S), or 1-UFY-210/00 Waves and Optics (Physics Teacher Training in combination 2/S), or 1-TEF-205 Optics (Technical Physics 2/S)<br>or 1-FYZ-211/17 Electromagnetism and Optics (Physics 2/W)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                        |
| <b>Course requirements:</b><br>Ongoing evaluation:<br>Examination: oral / written<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 0/100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                        |
| <b>Learning outcomes:</b><br>After completing the course, students will have knowledge of several laser spectroscopic methods and their advantages over classical spectroscopic methods. They will know in which applications these methods can be used.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                        |
| <b>Class syllabus:</b><br>Principles of radiation interaction with particles. Einstein coefficients. Basic principles of absorption and emission / excitation spectroscopic methods. Absorption and emission line, its profile and extension. Instrumentation (radiation sources, dispersive elements, interferometers, detectors,...). Comparison of classical and laser spectroscopic methods, explanation of why it is advantageous to use a laser. Absorption path extension, optical resonator. Laser - in terms of its usability in spectroscopy. Classical absorption methods (UV-Vis, IR) in comparison with laser (intercavity laser induced spectroscopy, cavity enhanced absorption spectroscopy, cavity ring down spectroscopy), optical plasma emission spectroscopy, classical and laser fluorescence spectroscopy, laser photoionization spectroscopy. Raman spectroscopy and its comparison with Coherent-Antistokes Raman Scattering spectroscopy. |                                                                        |
| <b>Recommended literature:</b><br>Laserová spektroskopia / Zuzana Chorvátová. Bratislava : Univerzita Komenského, 1992                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                        |

Laser spectroscopy : Basic concepts and instrumentation / Wolfgang Demtröder. Berlin : Springer, 1981  
 Optics and lasers : Including fibers and optical waveguides / Matt Young. Berlin : Springer, 2000

**Languages necessary to complete the course:**

Slovak and English.

**Notes:**

**Past grade distribution**

Total number of evaluated students: 1

| A     | B   | C   | D   | E   | FX  |
|-------|-----|-----|-----|-----|-----|
| 100,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 |

**Lecturers:** doc. RNDr. Mário Janda, PhD., prof. RNDr. Pavel Veis, CSc.

**Last change:** 22.02.2022

**Approved by:** doc. RNDr. Tomáš Blažek, PhD.

## COURSE DESCRIPTION

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                            |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                            |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                            |
| <b>Course ID:</b><br>FMFI.KEF/1-FYZ-806/22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Course title:</b><br>Introduction to optics, lasers, spectroscopic, interference and scattering methods |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                            |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                            |
| <b>Recommended semester:</b> 7.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                            |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                            |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                            |
| <b>Recommended prerequisites:</b><br>1-FYZ-218/22 Optics (Physics 2/S), or 1-UFY-210/00 Waves and Optics (Physics Teacher Training in combination 2/S), or 1-TEF-205 Optics (Technical Physics 2/S)<br>or 1-FYZ-211/17 Electromagnetism and Optics (Physics 2/W)                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                            |
| <b>Course requirements:</b><br>Final evaluation:<br>Examination: oral / written<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 0/100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                            |
| <b>Learning outcomes:</b><br>The student will gain basic knowledge of optics, spectrometers, interference and scattering techniques. detectors, lasers and their use.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                            |
| <b>Class syllabus:</b><br>Electromagnetic radiation and properties. Spectral areas from vacuum UV to IR area. Optical properties of materials. Spectrometers (prismatic, grating, echelle). Interferometers. Optical fibers. Detectors (photodiode, CCD, iCCD, EMCCD, photomultiplier). Spectral sensitivity calibration methods. Radiation sources. Lasers (laser principle, optical resonator, best known lasers and special laser systems). Properties of laser radiation. Examples of laser applications. Energy and wave dispersive X-ray spectroscopy; X-ray scattering, diffraction, reflectivity and microscopy; Free electron synchrotron radiation and laser; THz radiation, its sources and detection, THz spectroscopy. |                                                                                                            |
| <b>Recommended literature:</b><br>Laserová spektroskopia / Zuzana Chorvátová. Bratislava : Univerzita Komenského, 1992<br>Laser spectroscopy : Basic concepts and instrumentation / Wolfgang Demtröder. Berlin : Springer, 1981<br>Optics and lasers : Including fibers and optical waveguides / Matt Young. Berlin : Springer, 2000                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                            |

|                                                                                   |     |     |     |     |     |
|-----------------------------------------------------------------------------------|-----|-----|-----|-----|-----|
| <b>Languages necessary to complete the course:</b><br>Slovak and English.         |     |     |     |     |     |
| <b>Notes:</b>                                                                     |     |     |     |     |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 1           |     |     |     |     |     |
| A                                                                                 | B   | C   | D   | E   | FX  |
| 100,0                                                                             | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 |
| <b>Lecturers:</b> prof. RNDr. Pavel Veis, CSc., doc. RNDr. Tomáš Roch, Dr. techn. |     |     |     |     |     |
| <b>Last change:</b> 21.06.2022                                                    |     |     |     |     |     |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                 |     |     |     |     |     |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                              |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                              |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                              |
| <b>Course ID:</b><br>FMFI.KDMFI/1-KXX-003/20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Course title:</b><br>Laboratory Practicals in Physics (1) |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 3 per level/semester: 39</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                              |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                              |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                              |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                              |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                              |
| <b>Course requirements:</b><br>A: at least 90%, B at least 80%, C at least 70%, D at least 60%, E at least 50%.<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                              |
| <b>Learning outcomes:</b><br>Students will develop skills to empirically examine physical phenomena at the level corresponding to the target requirements for the high-school final examination in physics in the areas listed in the brief syllabus.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                              |
| <b>Class syllabus:</b><br>Measurement of physical quantities (length, mass, volume, time, temperature, force, gas pressure, electric current, electric voltage, magnetic induction, lighting, sound frequency)<br>Physical dependence (independent and dependent variable, experiment constants), dependence graph, dependence table, mathematical description of dependence.<br>Direct ratio and linear dependence. Linearization of nonlinear dependence by substitution and logarithmization.<br>Random and systematic error of a series of measurements.<br>Complete laboratory work - problem identification, formulation of hypotheses, selection of variables, design of apparatus, data collection and processing, formulation of conclusions, evaluation.<br>Real group computer-aided laboratory experiments focused on the following areas:<br>Hydrostatic compressive force in a liquid, Archimedes' law, Bernoulli's equation for a liquid, resistive force when moving a solid in a liquid, moving a conductor in a magnetic field, moving a magnet in a coil, sound generation, speed of sound propagation, standing waves on a stretched string and on an air column, sound interference). |                                                              |
| <b>Recommended literature:</b><br>Počítačom podporované prírodovedné laboratórium / Peter Demkanin a kol.. Bratislava : Knižničné a edičné centrum, 2006<br>Physics : Principles with applications / Douglas C. Giancoli. Harlow : Pearson Education, 2016                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                              |

Fyzika 1 / David Halliday, Robert Resnick, Jearl Walker ; redakce českého vydání Petr Dub ; přeložili Miroslav Černý ... [et al.]. Brno : VUTIUM, 2013

**Languages necessary to complete the course:**

Slovak, English

**Notes:**

**Past grade distribution**

Total number of evaluated students: 100

| A   | B   | C    | D    | E    | FX   |
|-----|-----|------|------|------|------|
| 6,0 | 8,0 | 20,0 | 28,0 | 14,0 | 24,0 |

**Lecturers:** doc. PaedDr. Viera Haverlíková, PhD., PaedDr. Lukáš Bartošovič, PhD.

**Last change:** 16.03.2022

**Approved by:** doc. RNDr. Tomáš Blažek, PhD.

## COURSE DESCRIPTION

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                              |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                              |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                              |
| <b>Course ID:</b><br>FMFI.KDMFI/1-KXX-013/20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Course title:</b><br>Laboratory Practicals in Physics (2) |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 3 per level/semester: 39</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                             |                                                              |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                              |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                              |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                              |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                              |
| <b>Course requirements:</b><br>A: 90%, B:80%, C:70%, D:60%, E:50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                              |
| <b>Learning outcomes:</b><br>Students will develop skills to empirically examine physical phenomena at the level corresponding to the target requirements for the high-school final examination in physics in the areas listed in the brief syllabus.                                                                                                                                                                                                                                                                                                                                                      |                                                              |
| <b>Class syllabus:</b><br>Mathematical modeling of real physical situations. Comparison of data obtained by a mathematical model with data from a real experiment.<br>Video measurement.<br>Mathematical model and output in the form of interactive animation.<br>Real group computer-aided laboratory experiments focused on the following areas:<br>Newton's laws of motion, forces acting on circular motion, inertia, energy of a rotating body, ideal gas phenomena, heat capacity, radiation energy transfer, beam optics, dispersion, interference and diffraction of light, black body radiation. |                                                              |
| <b>Recommended literature:</b><br>Počítačom podporované prírodovedné laboratórium / Peter Demkanin a kol.. Bratislava : Knižničné a edičné centrum, 2006<br>Physics : Principles with applications / Douglas C. Giancoli. Harlow : Pearson Education, 2016<br>Fyzika 1 / David Halliday, Robert Resnick, Jearl Walker ; redakce českého vydání Petr Dub ; přeložili Miroslav Černý ... [et al.]. Brno : VUTUM, 2013<br>Fyzika 2 / David Halliday, Robert Resnick, Jearl Walker ; redakce českého vydání Petr Dub ; přeložili Miroslav Černý ... [et al.]. Brno : VUTUM, 2013                               |                                                              |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                              |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                              |

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|-------------------------------------------------------------------------------|-----|-----|-----|-----|------|
| <b>Past grade distribution</b>                                                |     |     |     |     |      |
| Total number of evaluated students: 50                                        |     |     |     |     |      |
| A                                                                             | B   | C   | D   | E   | FX   |
| 62,0                                                                          | 4,0 | 6,0 | 0,0 | 8,0 | 20,0 |
| <b>Lecturers:</b> PaedDr. Peter Horváth, PhD., PaedDr. Lukáš Bartošovič, PhD. |     |     |     |     |      |
| <b>Last change:</b> 15.03.2022                                                |     |     |     |     |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                             |     |     |     |     |      |

## COURSE DESCRIPTION

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------------------------------|-------|------|------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                        |       |                                                |       |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                      |       |                                                |       |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                        |       |                                                |       |      |      |
| <b>Course ID:</b><br>FMFI.KAI/1-AIN-406/22                                                                                                                                                                                                                                                                                                                                             |       | <b>Course title:</b><br>Language and Cognition |       |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> course<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                      |       |                                                |       |      |      |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                            |       |                                                |       |      |      |
| <b>Recommended semester:</b> 2., 4., 6.                                                                                                                                                                                                                                                                                                                                                |       |                                                |       |      |      |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                                                                                                                                                                    |       |                                                |       |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                  |       |                                                |       |      |      |
| <b>Course requirements:</b><br>Continuous assessment: presentations, bonus assignments<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                             |       |                                                |       |      |      |
| <b>Learning outcomes:</b><br>Acquisition of the most important current theories and methods of studying natural language and cognitive processes.                                                                                                                                                                                                                                      |       |                                                |       |      |      |
| <b>Class syllabus:</b><br>The course focuses on the most important aspects of natural language research (the most complex cognitive function): basic properties of language (arbitrariness, generative productivity, dynamism, structuring at many levels), mechanisms of speech production and perception, language acquisition, innate and acquired factors of language development. |       |                                                |       |      |      |
| <b>Recommended literature:</b><br>G. Dorren: Babel. Around the World in 20 Languages. Profile Books, 2019<br>S. Pinker: Language Instinct. †Brilliance Audio, 2014<br>S. Pinker: The Stuff of Thought. Language as a Window Into Human Nature. Penguin Books 2008<br>S. Pinker: Words and Rules. The Ingredients of Language. Basic Books 2015                                         |       |                                                |       |      |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                  |       |                                                |       |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                          |       |                                                |       |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 172                                                                                                                                                                                                                                                                                                              |       |                                                |       |      |      |
| A                                                                                                                                                                                                                                                                                                                                                                                      | B     | C                                              | D     | E    | FX   |
| 37,79                                                                                                                                                                                                                                                                                                                                                                                  | 23,84 | 15,12                                          | 11,05 | 5,23 | 6,98 |
| <b>Lecturers:</b> doc. PhDr. Ján Rybár, PhD.                                                                                                                                                                                                                                                                                                                                           |       |                                                |       |      |      |

|                                                   |
|---------------------------------------------------|
| <b>Last change:</b> 17.05.2024                    |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                         |      |                                                    |      |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                       |      |                                                    |      |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                         |      |                                                    |      |      |      |
| <b>Course ID:</b><br>FMFI.KAG/1-FYZ-411/22                                                                                                                                                                                                                                                                                              |      | <b>Course title:</b><br>Linear Algebra Classes (1) |      |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 1 <b>per level/semester:</b> 13<br><b>Form of the course:</b> on-site learning                                                                                                                                   |      |                                                    |      |      |      |
| <b>Number of credits:</b> 1                                                                                                                                                                                                                                                                                                             |      |                                                    |      |      |      |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                         |      |                                                    |      |      |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                            |      |                                                    |      |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                   |      |                                                    |      |      |      |
| <b>Course requirements:</b>                                                                                                                                                                                                                                                                                                             |      |                                                    |      |      |      |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                                                               |      |                                                    |      |      |      |
| <b>Class syllabus:</b><br>It is a supplementary exercise to "Algebra and Geometry (1)".                                                                                                                                                                                                                                                 |      |                                                    |      |      |      |
| <b>Recommended literature:</b><br>Linear Algebra and Geometry: A Journey of Three Dimensions with Overlaps in Related Fields / Pavol Zlatoš. Bratislava: Albert Marenčin, 2011; electronic version available at <a href="http://thales.doa.fmfi.uniba.sk/zlatos/la/LAG_A4.pdf">http://thales.doa.fmfi.uniba.sk/zlatos/la/LAG_A4.pdf</a> |      |                                                    |      |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                      |      |                                                    |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                           |      |                                                    |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 293                                                                                                                                                                                                                                                               |      |                                                    |      |      |      |
| A                                                                                                                                                                                                                                                                                                                                       | B    | C                                                  | D    | E    | FX   |
| 43,0                                                                                                                                                                                                                                                                                                                                    | 15,7 | 15,7                                               | 8,87 | 9,56 | 7,17 |
| <b>Lecturers:</b> prof. RNDr. Pavol Zlatoš, PhD., Mgr. Marián Poturnay                                                                                                                                                                                                                                                                  |      |                                                    |      |      |      |
| <b>Last change:</b> 18.05.2022                                                                                                                                                                                                                                                                                                          |      |                                                    |      |      |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                                                                                       |      |                                                    |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                         |       |                                                    |      |       |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                       |       |                                                    |      |       |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                         |       |                                                    |      |       |      |
| <b>Course ID:</b><br>FMFI.KAG/1-FYZ-412/22                                                                                                                                                                                                                                                                                              |       | <b>Course title:</b><br>Linear Algebra Classes (2) |      |       |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 1 <b>per level/semester:</b> 13<br><b>Form of the course:</b> on-site learning                                                                                                                                   |       |                                                    |      |       |      |
| <b>Number of credits:</b> 1                                                                                                                                                                                                                                                                                                             |       |                                                    |      |       |      |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                                                                         |       |                                                    |      |       |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                            |       |                                                    |      |       |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                   |       |                                                    |      |       |      |
| <b>Course requirements:</b>                                                                                                                                                                                                                                                                                                             |       |                                                    |      |       |      |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                                                               |       |                                                    |      |       |      |
| <b>Class syllabus:</b><br>It is a supplementary exercise to "Algebra and Geometry (1)".                                                                                                                                                                                                                                                 |       |                                                    |      |       |      |
| <b>Recommended literature:</b><br>Linear Algebra and Geometry: A Journey of Three Dimensions with Overlaps in Related Fields / Pavol Zlatoš. Bratislava: Albert Marenčin, 2011; electronic version available at <a href="http://thales.doa.fmph.uniba.sk/zlatos/la/LAG_A4.pdf">http://thales.doa.fmph.uniba.sk/zlatos/la/LAG_A4.pdf</a> |       |                                                    |      |       |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                      |       |                                                    |      |       |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                           |       |                                                    |      |       |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 163                                                                                                                                                                                                                                                               |       |                                                    |      |       |      |
| A                                                                                                                                                                                                                                                                                                                                       | B     | C                                                  | D    | E     | FX   |
| 52,76                                                                                                                                                                                                                                                                                                                                   | 10,43 | 11,04                                              | 6,75 | 12,88 | 6,13 |
| <b>Lecturers:</b> prof. RNDr. Pavol Zlatoš, PhD., Mgr. Nina Hronkovičová, PhD.                                                                                                                                                                                                                                                          |       |                                                    |      |       |      |
| <b>Last change:</b> 18.05.2022                                                                                                                                                                                                                                                                                                          |       |                                                    |      |       |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                                                                                       |       |                                                    |      |       |      |

## COURSE DESCRIPTION

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                         |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                         |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                         |
| <b>Course ID:</b><br>FMFI.KAI/1-AIN-500/22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Course title:</b><br>Linux for Users |
| <b>Educational activities:</b><br><b>Type of activities:</b> course<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                         |
| <b>Type, volume, methods and workload of the student - additional information</b><br>talk, 1h/week, online synchronous<br>training, 2h/week, online synchronous                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                         |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                         |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                         |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                         |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                         |
| <b>Course requirements:</b><br>Priebežné hodnotenie: practical computer exercises<br>Skúška: practical computer exam<br>Orientačná stupnica hodnotenia: A 92%, B 84%, C 76%, D 68%, E 60%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                         |
| <b>Learning outcomes:</b><br>Graduate: <ul style="list-style-type: none"> <li>- knows the principle and function of the command line</li> <li>- knows the principles of operation of the GNU/Linux operating system</li> <li>- knows and understands the basic components of the GNU/Linux OS such as process, file system, user administration, access rights, ...</li> <li>- recognizes and applies a set of commands according to scenarios</li> <li>- creates a "oneline compound command" or a simple script to solve task assignment</li> </ul>                                                                                                                                                                                                     |                                         |
| <b>Class syllabus:</b> <ul style="list-style-type: none"> <li>- History and philosophy of GNU / Linux. Text console. File system navigation. (pwd, ls, cd, less, cat, man, w, exit, ssh, mosh, ...)</li> <li>- Directories and files (mkdir, rmdir, rm, cp, mv, ...)</li> <li>- Users, groups, redirects and search. Regular expressions. (id, su, passwd, grep, ...)</li> <li>- File and directory attributes (chown, chgrp, chmod, ...)</li> <li>- Text editor vim</li> <li>- File content sorting and selection commands (sort, head, tail, nl, uniq, tac, shuf)</li> <li>- File system searching (find)</li> <li>- Processes (ps, top, kill)</li> <li>- sed - stream editor</li> <li>- Processing by awk</li> <li>- Basics of bash scripts</li> </ul> |                                         |

|                                                                                                                                    |       |      |      |      |      |
|------------------------------------------------------------------------------------------------------------------------------------|-------|------|------|------|------|
| <b>Recommended literature:</b>                                                                                                     |       |      |      |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                 |       |      |      |      |      |
| <b>Notes:</b><br>The tasks are solved in a specialized software tool, which also enables effective distance synchronous education. |       |      |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 1993                                                         |       |      |      |      |      |
| A                                                                                                                                  | B     | C    | D    | E    | FX   |
| 43,65                                                                                                                              | 15,35 | 14,6 | 9,63 | 9,83 | 6,92 |
| <b>Lecturers:</b> Mgr. Ivor Uhliarik, PhD., Tamara Bíla                                                                            |       |      |      |      |      |
| <b>Last change:</b> 20.06.2022                                                                                                     |       |      |      |      |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                  |       |      |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                             |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                             |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                             |
| <b>Course ID:</b><br>FMFI.KJFB+KTF/1-FYZ-116/22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Course title:</b><br>Mathematical Methods in Physics (1) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 / 2 <b>per level/semester:</b> 52 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                             |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                             |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                             |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                             |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                             |
| <b>Antirequisites:</b> FMFI.KJFB/1-FYZ-116/15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                             |
| <b>Course requirements:</b><br>For the semester, the student can get 30% (for tests) and the final written exam has a weight of 50%. The student must obtain at least half a point per semester in order to pass the final written exam. Indicative scale: A (100% -91% ), B (90% -81% ), C (80% -71% ), D (70% -61% ), E (60% -51% ), Fx (50% -0% ).<br>Scale of assessment (preliminary/final): 30/70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                             |
| <b>Learning outcomes:</b><br>After completing the course, students will be able to use advanced mathematical methods necessary to master physics courses. In particular, methods of differential and integral calculus.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                             |
| <b>Class syllabus:</b><br>Scalars and vectors, operations of their use in physics. Linear algebra (solving equations with several variables, linear independence, determinants, matrices). Complex numbers and their use. Limits and derivatives (physical, geometric meaning, rules for calculation, use of derivatives in mathematics and physics - velocity, acceleration, differential, extrema). Integrals (methods of integration - modifications, per partes, substitution). Applications of integrals in physical practice, the principle of superposition (calculation of centers of gravity, moments of inertia, potentials of conservative fields, forces acting between bodies of different shapes). Numerical methods of derivation and integration. Council (Taylor and Mac Laurinov, Fourier work). Differential equations as a basic language of physics (separable DR, homogeneous DR, DR order reduction method, linear DR of the first and second degree, method of variation of constants, method of indeterminate coefficients, method of compiling DR and their use in physics). DR solutions that cannot be solved explicitly (qualitative method, development into a series, numerical method of LDR solution). |                                                             |
| <b>Recommended literature:</b><br>Matematika pre fyzikov / A. Grega, D. Kluvanec, E. Rajčan. Bratislava : Slovenské pedagogické nakladateľstvo, 1974<br>Matematický aparát fyziky / Jozef Kvasnica. Praha : Academia, 1997                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                             |

Matematické metody ve fyzice a technice / John Warren Dettman ; přeložil Jiří Langer ; vedec. red. Miroslav Brdička. Praha : Academia, 1970

**Languages necessary to complete the course:**

Slovak, English

**Notes:**

**Past grade distribution**

Total number of evaluated students: 421

| A     | B     | C     | D     | E     | FX   |
|-------|-------|-------|-------|-------|------|
| 21,38 | 11,16 | 17,58 | 16,39 | 20,19 | 13,3 |

**Lecturers:** doc. RNDr. Radoslav Böhm, PhD., prof. RNDr. Fedor Šimkovic, CSc.

**Last change:** 21.06.2022

**Approved by:** doc. RNDr. Tomáš Blažek, PhD.

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                             |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                             |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                             |
| <b>Course ID:</b><br>FMFI.KJFB+KTF/1-FYZ-117/22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Course title:</b><br>Mathematical Methods in Physics (2) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 / 2 <b>per level/semester:</b> 52 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                             |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                             |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                             |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                             |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                             |
| <b>Antirequisites:</b> FMFI.KJFB/1-FYZ-117/15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                             |
| <b>Course requirements:</b><br>For the semester, the student can get 30% (for tests) and the final written exam has a weight of 50%. The student must obtain at least half a point per semester in order to pass the final written exam. Indicative scale: A (100% -91% ), B (90% -81% ), C (80% -71% ), D (70% -61% ), E (60% -51% ), Fx (50% -0% ).<br>Scale of assessment (preliminary/final): 30/70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                             |
| <b>Learning outcomes:</b><br>After completing the course, students will be able to use advanced mathematical methods necessary to master physics courses. They will be skilled in the use of numerical methods and able to process the measured experimental data.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                             |
| <b>Class syllabus:</b><br>Multiple variable functions. Multidimensional integrals and their use in physics (integration over the "rectangle", integration over the set, substitution method - transformation of the integral into different coordinate systems, calculation of the moment of inertia, calculation of the position of the center of gravity). Vector scalar argument function. Coordinate systems (polar, cylindrical, spherical - volume and area elements, speed determination, accelerations in various bases). Tensors (motivation for the introduction of the tensor - the relationship between the momentum and angular velocity in rotational motion, the moment of inertia tensor and its components, the search for the main axes of the inertia tensor). Curve integrals and their use in physics (curve integrals of the 1st and 2nd kind - work, center of gravity, conservative and non-conservative fields - without criteria). Fundamentals of vector analysis (directional derivation, gradient of scalar function and its Einstein summation convention, Laplace operator in various coordinate systems, rotation and divergence of vector function - creation of "idea" based on analogy with hydrodynamics. Gauss-Ostrogradsky theorem, Stokes theorem and its application Field conservation criteria, area calculation). Fundamentals of statistics (Random variables - discrete and continuous, probability density, Gaussian distribution, calculation of means, standard deviation, applications in physics, |                                                             |

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| data processing elements, arithmetic mean error, data fitting, minimization of the sum of squares).<br>Partial DR and their use in physics (wave equation, methods of solving partial DR) Numerical<br>methods for solving partial DR. |       |       |       |       |      |
| <b>Recommended literature:</b>                                                                                                                                                                                                         |       |       |       |       |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                  |       |       |       |       |      |
| <b>Notes:</b>                                                                                                                                                                                                                          |       |       |       |       |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 295                                                                                                                                                              |       |       |       |       |      |
| A                                                                                                                                                                                                                                      | B     | C     | D     | E     | FX   |
| 23,73                                                                                                                                                                                                                                  | 14,58 | 19,66 | 17,29 | 17,29 | 7,46 |
| <b>Lecturers:</b> doc. RNDr. Radoslav Böhml, PhD., prof. RNDr. Fedor Šimkovic, CSc.                                                                                                                                                    |       |       |       |       |      |
| <b>Last change:</b> 21.06.2022                                                                                                                                                                                                         |       |       |       |       |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                      |       |       |       |       |      |

## COURSE DESCRIPTION

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------------------------------|------|------|------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                   |       |                                              |      |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                 |       |                                              |      |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                   |       |                                              |      |      |      |
| <b>Course ID:</b><br>FMFL.KTF/1-FYZ-677/15                                                                                                                                                                                                        |       | <b>Course title:</b><br>Mathematical Physics |      |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 / 2 <b>per level/semester:</b> 52 / 26<br><b>Form of the course:</b> on-site learning                          |       |                                              |      |      |      |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                       |       |                                              |      |      |      |
| <b>Recommended semester:</b> 7.                                                                                                                                                                                                                   |       |                                              |      |      |      |
| <b>Educational level:</b> I., II.                                                                                                                                                                                                                 |       |                                              |      |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                             |       |                                              |      |      |      |
| <b>Course requirements:</b><br>Continuous assessment: homework<br>Examination: two written exams during the semester<br>Indicative rating scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0              |       |                                              |      |      |      |
| <b>Learning outcomes:</b><br>After completing the course, students will be able to use the material contained in the Brief syllabus.                                                                                                              |       |                                              |      |      |      |
| <b>Class syllabus:</b><br>Fundamentals of analysis on manifolds (tensor fields, Lie derivatives, Killing fields, ...) and introduction to the theory of Lie groups and Lie algebras and their representations. Group actions, homogeneous spaces. |       |                                              |      |      |      |
| <b>Recommended literature:</b><br>Differential geometry and Lie groups for physicists / Marián Fecko. Cambridge : Cambridge University Press, 2006<br>Crampin,Pirani: Applicable differential geometry, CUP 1986                                  |       |                                              |      |      |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                             |       |                                              |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                     |       |                                              |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 84                                                                                                                                                                          |       |                                              |      |      |      |
| A                                                                                                                                                                                                                                                 | B     | C                                            | D    | E    | FX   |
| 48,81                                                                                                                                                                                                                                             | 16,67 | 16,67                                        | 5,95 | 5,95 | 5,95 |
| <b>Lecturers:</b> doc. RNDr. Marián Fecko, PhD.                                                                                                                                                                                                   |       |                                              |      |      |      |
| <b>Last change:</b> 11.08.2022                                                                                                                                                                                                                    |       |                                              |      |      |      |

**Approved by:** doc. RNDr. Tomáš Blažek, PhD.

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                         |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                         |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                         |
| <b>Course ID:</b><br>FMFI.KMANM/1-<br>FYZ-120/17                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Course title:</b><br>Mathematics (1) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 5 / 3 <b>per level/semester:</b> 65 / 39<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                               |                                         |
| <b>Number of credits:</b> 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                         |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                         |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                         |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                         |
| <b>Course requirements:</b><br>Interim assessment: During the semester, there will be five written examinations for a total of 65 points. The student has the opportunity to obtain another 35 points for working on the exercises according to the instructions of the professional assistants who lead them. The student needs to get at least 60 points for work during the semester.<br>Exam: The exam consists of a written and an oral part.<br>Indicative assessment scale: A 92%, B 84%, C 76%, D 68%, E 60%<br>Scale of assessment (preliminary/final): 50/50 |                                         |
| <b>Learning outcomes:</b><br>The student will learn the basics of differential and integral calculus of functions of one real variable.                                                                                                                                                                                                                                                                                                                                                                                                                                |                                         |
| <b>Class syllabus:</b><br>Real and complex numbers, sequences and their limits, completeness and square root of a positive real number, numerical infinite series, exponential function, functions of a real variable and their limits, continuity and properties of continuous functions, elementary functions (power function, logarithm and trigonometric functions).                                                                                                                                                                                               |                                         |
| <b>Recommended literature:</b><br>Analysis 1: Forster Otto, Vieweg, Springer Spektrum, 2015<br>Mathematics 1: For the study of technical sciences / I. Kľuvánek ... [et al.]. Bratislava: SVTL, 1966<br>Exercises in Mathematical Analysis I / Zbyněk Kubáček, Ján Valášek. Bratislava: Comenius University, 2001<br>Collection of tasks and exercises in mathematical analysis / Boris Pavlovič Dėmidovič; translated from the Russian original by Miroslav Rozložník and Miroslav Tůma. Havlickuv Brod: Fragment, 2003                                               |                                         |
| <b>Languages necessary to complete the course:</b><br>slovenský, anglický                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                         |

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|---------------------------------------------------------------------------------------------|------|-------|-------|-------|-------|
| <b>Notes:</b>                                                                               |      |       |       |       |       |
| <b>Past grade distribution</b>                                                              |      |       |       |       |       |
| Total number of evaluated students: 438                                                     |      |       |       |       |       |
| A                                                                                           | B    | C     | D     | E     | FX    |
| 13,47                                                                                       | 7,53 | 12,79 | 13,47 | 27,63 | 25,11 |
| <b>Lecturers:</b> prof. RNDr. Ján Filo, CSc., Mgr. Zuzana Šinská, RNDr. Patrik Mihala, PhD. |      |       |       |       |       |
| <b>Last change:</b> 21.06.2022                                                              |      |       |       |       |       |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                           |      |       |       |       |       |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                         |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                         |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                         |
| <b>Course ID:</b><br>FMFI.KMANM/1-<br>FYZ-135/17                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Course title:</b><br>Mathematics (2) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 5 / 3 <b>per level/semester:</b> 65 / 39<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                               |                                         |
| <b>Number of credits:</b> 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                         |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                         |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                         |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                         |
| <b>Course requirements:</b><br>Interim assessment: During the semester, there will be five written examinations for a total of 65 points. The student has the opportunity to obtain another 35 points for working on the exercises according to the instructions of the professional assistants who lead them. The student needs to get at least 60 points for work during the semester.<br>Exam: The exam consists of a written and an oral part.<br>Indicative assessment scale: A 92%, B 84%, C 76%, D 68%, E 60%<br>Scale of assessment (preliminary/final): 50/50 |                                         |
| <b>Learning outcomes:</b><br>The student will learn the basics of differential and integral calculus of functions of one real variable in parts: infinite series and Riemann integral.                                                                                                                                                                                                                                                                                                                                                                                 |                                         |
| <b>Class syllabus:</b><br>Differentiability and properties of differentiable functions, investigation of functions, numerical solution of equations, Riemannian integral, primitive function and methods of calculation of indefinite integrals, improper integrals, functional sequences and series, uniform convergence and its applications, power series, Taylor series.                                                                                                                                                                                           |                                         |
| <b>Recommended literature:</b><br>Analysis I, Forster Otto, Vieweg, Springer Spectrum, 2015<br>Mathematics for the Study of Technical Sciences: Parts 1 and 2 / Igor Kluvánek, Ladislav Mišík, Marko Švec. Bratislava: Alfa, 1970<br>Exercises in Mathematical Analysis I and II / Zbyněk Kubáček, Ján Valášek. Bratislava: Comenius University, 1996<br>Collection of tasks and exercises in mathematical analysis / Boris Pavlovič Dėmidovič; translated from the Russian original by Miroslav Rozložník and Miroslav Tůma. Havlickuv Brod: Fragment, 2003           |                                         |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                         |

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| <b>Notes:</b>                                                                               |       |       |       |       |       |
| <b>Past grade distribution</b><br>Total number of evaluated students: 302                   |       |       |       |       |       |
| A                                                                                           | B     | C     | D     | E     | FX    |
| 13,91                                                                                       | 12,25 | 12,58 | 19,21 | 23,18 | 18,87 |
| <b>Lecturers:</b> prof. RNDr. Ján Filo, CSc., RNDr. Patrik Mihala, PhD., Mgr. Zuzana Šinská |       |       |       |       |       |
| <b>Last change:</b> 21.06.2022                                                              |       |       |       |       |       |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                           |       |       |       |       |       |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                         |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                         |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                         |
| <b>Course ID:</b><br>FMFI.KMANM/1-<br>FYZ-215/17                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Course title:</b><br>Mathematics (3) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 5 / 3 <b>per level/semester:</b> 65 / 39<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                    |                                         |
| <b>Number of credits:</b> 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                         |
| <b>Recommended semester:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                         |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                         |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                         |
| <b>Course requirements:</b><br>Continuous assessment, final exam.<br>Grades: A (100-91), B (90-81), C (80-71), D (70-61), E (60-51), Fx (50-0).<br>Scale of assessment (preliminary/final): 70/30: detailed 30 for midterm and 30 for exam, bonus: 10 quick tests during lectures                                                                                                                                                                                                                                                                                                           |                                         |
| <b>Learning outcomes:</b><br>The student will have an overview of the use of curve and area integrals, potential theory. They become actively acquainted with the methods and use of parametric integrals. He will actively control the work with Euler integrals. They will get acquainted with Fourier series and their use in solving physical problems of diffusion and potential theory.                                                                                                                                                                                               |                                         |
| <b>Class syllabus:</b><br>Line integrals and potential of vector functions. Area integrals, Stokes and Gauss formulas. Parameter dependent integrals, their analytical properties. Euler integrals. Fourier series, convergence theorems, applications in linear diffusion theory. Fourier transform basic properties of Fourier transform, convergence of Fourier integral.                                                                                                                                                                                                                |                                         |
| <b>Recommended literature:</b><br>Demetrian, M., Integrály v R <sup>6</sup> N, integrály závislé od parametra, krivkové a plošné integrály, Univerzita Komenského : Bratislava, 2023<br>Kluvánek, I., Mišík, L., Švec M. : (1961) Mathematics II, SVTL Bratislava.<br>M. Demetrian, Fourier series and Fourier integral, Bratislava, UK, 2012<br>Boris Pavlovič Dëmidovič, Collection of Problems and Exercises in Mathematical Analysis, Fragment Publishing House, 2003<br>Eliáš, J., Horváth, J., Kajan, J. : (1972) Collection of problems in higher mathematics , IV, SNTL Bratislava. |                                         |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                         |

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| <b>Notes:</b>                                                                    |      |      |       |       |       |
| <b>Past grade distribution</b><br>Total number of evaluated students: 327        |      |      |       |       |       |
| A                                                                                | B    | C    | D     | E     | FX    |
| 7,95                                                                             | 8,26 | 9,17 | 13,15 | 35,78 | 25,69 |
| <b>Lecturers:</b> doc. RNDr. Michal Demetrian, PhD., RNDr. Michal Pospíšil, PhD. |      |      |       |       |       |
| <b>Last change:</b> 11.09.2025                                                   |      |      |       |       |       |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                |      |      |       |       |       |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                           |                                         |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                         |                                         |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                           |                                         |
| <b>Course ID:</b><br>FMFLKMANM/1-<br>FYZ-225/15                                                                                                                                                                                                                                                                                                                                           | <b>Course title:</b><br>Mathematics (4) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 / 2 <b>per level/semester:</b> 52 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                  |                                         |
| <b>Number of credits:</b> 6                                                                                                                                                                                                                                                                                                                                                               |                                         |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                                                                                                                                                                           |                                         |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                              |                                         |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                     |                                         |
| <b>Recommended prerequisites:</b><br>1-FYZ-215 Mathematics (3)                                                                                                                                                                                                                                                                                                                            |                                         |
| <b>Course requirements:</b><br>Evaluation during semester: 3 written tests 20 points each.<br>Final exam: written test (40 points).<br>Requirements for the final exam: minimum of 30 points from semestral evaluation.<br>Final evaluation:<br>100 - 90 A,<br>89 - 80 B,<br>79 - 70 C,<br>69 - 60 D,<br>59 - 50 E,<br>less than 50 FX.<br>Scale of assessment (preliminary/final): 60/40 |                                         |
| <b>Learning outcomes:</b><br>The student will be familiar with the methods and applications of the theory of functions of a complex variable.                                                                                                                                                                                                                                             |                                         |
| <b>Class syllabus:</b><br>Elementary functions of a complex variable. Derivatives of a function of a complex variable. Cauchy-Riemann conditions. Conformal mappings. Curve integral. Cauchy's theorem. Cauchy integral formula. Taylor and Laurent's series. Residues. Argument principle.                                                                                               |                                         |
| <b>Recommended literature:</b><br>Mathematics for the study of technical sciences: 2 works / I. Kľuvánek ... [et al.]. Bratislava: SVTL, 1965<br>Fundamentals of the theory of functions of a complex variable / Michal Demetrian. Bratislava: Comenius University, 2012                                                                                                                  |                                         |

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| <b>Languages necessary to complete the course:</b><br>Slovak, English     |      |      |      |       |       |
| <b>Notes:</b>                                                             |      |      |      |       |       |
| <b>Past grade distribution</b><br>Total number of evaluated students: 253 |      |      |      |       |       |
| A                                                                         | B    | C    | D    | E     | FX    |
| 10,28                                                                     | 6,32 | 9,09 | 16,6 | 39,92 | 17,79 |
| <b>Lecturers:</b> Mgr. Július Pačuta, PhD., RNDr. Michal Pospíšil, PhD.   |      |      |      |       |       |
| <b>Last change:</b> 17.06.2022                                            |      |      |      |       |       |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                         |      |      |      |       |       |

## COURSE DESCRIPTION

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------------------------------------|------|-----|-----|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                               |       |                                         |      |     |     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                             |       |                                         |      |     |     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                               |       |                                         |      |     |     |
| <b>Course ID:</b><br>FMFI.KMANM/1-FYZ-350/22                                                                                                                                                                                                                                                  |       | <b>Course title:</b><br>Mathematics (5) |      |     |     |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning                                                                      |       |                                         |      |     |     |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                   |       |                                         |      |     |     |
| <b>Recommended semester:</b> 8.                                                                                                                                                                                                                                                               |       |                                         |      |     |     |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                  |       |                                         |      |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                         |       |                                         |      |     |     |
| <b>Course requirements:</b><br>interim and final exam:<br>continuous examination: tests(45%); final exam: written test(35%) and oral examination(20%)<br>Grades:<br>100-91% (A); 90-81% (B); 80-71% (C); 70-61% (D); 60-51% (E), 50-0% (Fx)<br>Scale of assessment (preliminary/final): 45/55 |       |                                         |      |     |     |
| <b>Learning outcomes:</b><br>The student will gain skills in solving differential equations and gain experience in working with qualitative methods in differential equations with emphasis on applications in physics.                                                                       |       |                                         |      |     |     |
| <b>Class syllabus:</b><br>Piccard's theorem. Integration methods for 1st order ODR. Existential theorem for linear DR. LDR solution set structure. Constant variation method. LDR solution using generalized power series. Some special LDR. Linear differential systems.                     |       |                                         |      |     |     |
| <b>Recommended literature:</b><br>Ordinary differential equations / Michal Greguš, Marko Švec, Valter Šeda. Bratislava: Alfa, 1985<br>Michal Demetrian, Ordinary Differential Equations, Comenius University 2013                                                                             |       |                                         |      |     |     |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                         |       |                                         |      |     |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                 |       |                                         |      |     |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 42                                                                                                                                                                                                                      |       |                                         |      |     |     |
| A                                                                                                                                                                                                                                                                                             | B     | C                                       | D    | E   | FX  |
| 50,0                                                                                                                                                                                                                                                                                          | 23,81 | 21,43                                   | 4,76 | 0,0 | 0,0 |
| <b>Lecturers:</b> prof. RNDr. Milan Medved', DrSc., RNDr. František Jaroš, PhD., Mgr. Iryna Zabaikina, PhD.                                                                                                                                                                                   |       |                                         |      |     |     |

|                                                   |
|---------------------------------------------------|
| <b>Last change:</b> 21.06.2022                    |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                         |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                |                                         |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                  |                                         |
| <b>Course ID:</b><br>FMFI.KMANM/1-FYZ-370/22                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Course title:</b><br>Mathematics (6) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                         |                                         |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                         |
| <b>Recommended semester:</b> 8.                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                         |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                         |
| <b>Prerequisites:</b> FMFI.KMANM/1-FYZ-120/17 - Mathematics (1) and FMFI.KMANM/1-FYZ-135/17 - Mathematics (2) and FMFI.KMANM/1-FYZ-215/17 - Mathematics (3)                                                                                                                                                                                                                                                                                                      |                                         |
| <b>Antirequisites:</b> FMFI.KMANM/1-FYZ-370/15                                                                                                                                                                                                                                                                                                                                                                                                                   |                                         |
| <b>Course requirements:</b><br>Interim assessment: During the semester, there will be two written examinations for a total of 32 points. The student gets the next 18 points for working on the exercises according to the instructions of the assistant professor who leads them.<br>Exam: The exam consists of a written and an oral part.<br>Indicative assessment scale: A 92%, B 84%, C 76%, D 68%, E 60%<br>Scale of assessment (preliminary/final): 50/50 |                                         |
| <b>Learning outcomes:</b><br>The graduate of this course has knowledge of the classical theory of basic types of partial differential equations and is able to use them to solve specific problems of linear PDR.                                                                                                                                                                                                                                                |                                         |
| <b>Class syllabus:</b><br>1. First order linear PDR (method of characteristics)<br>2. Wave equation - d'Alambert's formula, Kirchhoff's formula, Duhamel's principle<br>3. Heat conduction equation<br>4. Method of separation of variables<br>5. Laplace equation                                                                                                                                                                                               |                                         |
| <b>Recommended literature:</b><br>Partial differential equations / Lawrence C. Evans. Providence: American Mathematical Society, 1998<br>Partial differential equations: An introduction / Walter A. Strauss. Hoboken: Wiley, 2008<br>Mathematical Physics: Basic Equations and Special Functions / Vasily Yakovlevich Arsenin; translated by Jozef Kačur. Bratislava: Alfa, 1977                                                                                |                                         |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                            |                                         |

|                                                                           |     |       |       |       |     |
|---------------------------------------------------------------------------|-----|-------|-------|-------|-----|
| <b>Notes:</b>                                                             |     |       |       |       |     |
| <b>Past grade distribution</b>                                            |     |       |       |       |     |
| Total number of evaluated students: 3                                     |     |       |       |       |     |
| A                                                                         | B   | C     | D     | E     | FX  |
| 0,0                                                                       | 0,0 | 33,33 | 33,33 | 33,33 | 0,0 |
| <b>Lecturers:</b> prof. RNDr. Ján Filo, CSc., RNDr. Kristína Rostás, PhD. |     |       |       |       |     |
| <b>Last change:</b> 10.03.2022                                            |     |       |       |       |     |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                         |     |       |       |       |     |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                                                 |      |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                                                 |      |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                                                 |      |      |      |
| <b>Course ID:</b><br>FMFI.KMANM/1-<br>FYZ-405/22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      | <b>Course title:</b><br>Mathematics Classes (1) |      |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                       |      |                                                 |      |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                                                 |      |      |      |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                                                 |      |      |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |                                                 |      |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                                                 |      |      |      |
| <b>Course requirements:</b><br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                                                 |      |      |      |
| <b>Learning outcomes:</b><br>The student will learn the basics of differential and integral calculus of functions of one real variable.                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                                                 |      |      |      |
| <b>Class syllabus:</b><br>Support exercise for the course Mathematics (1):<br>Real numbers, sequences and their limits, functions of real variables and their limits, continuity and properties, differentiability and properties of differentiable functions, investigation of the course, primitive function, integral, methods of calculation of indefinite integrals (substitution, per partes), integration: rational, trigonometric and some irrational functions.<br>Giving a sufficient number of suggestions for homework and consulting solutions to these tasks. |      |                                                 |      |      |      |
| <b>Recommended literature:</b><br>The current textbooks recommended by the course teacher.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |                                                 |      |      |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                                                 |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |                                                 |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 347                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |                                                 |      |      |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | B    | C                                               | D    | E    | FX   |
| 72,62                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 8,65 | 4,03                                            | 2,02 | 8,36 | 4,32 |
| <b>Lecturers:</b> RNDr. Michal Pospíšil, PhD., RNDr. František Jaroš, PhD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |                                                 |      |      |      |
| <b>Last change:</b> 17.05.2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |                                                 |      |      |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                                                 |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                                 |      |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                       |       |                                                 |      |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                         |       |                                                 |      |      |      |
| <b>Course ID:</b><br>FMFI.KMANM/1-FYZ-406/22                                                                                                                                                                                                                                                                                                                                                                                            |       | <b>Course title:</b><br>Mathematics Classes (2) |      |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                   |       |                                                 |      |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                                 |      |      |      |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                                 |      |      |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                                 |      |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                 |      |      |      |
| <b>Course requirements:</b><br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                         |       |                                                 |      |      |      |
| <b>Learning outcomes:</b><br>The student will learn the basics of differential and integral calculus of functions of one real variable in parts: infinite series and Riemann integral.                                                                                                                                                                                                                                                  |       |                                                 |      |      |      |
| <b>Class syllabus:</b><br>Support exercise for the course Mathematics (2):<br>Riemannian definite integral, its properties and calculation using indefinite integrals, improper integrals, numerical infinite series. Functional sequences and series. Uniform convergence and its applications. Potential series and Taylor series.<br>Giving a sufficient number of suggestions for homework and consulting solutions to these tasks. |       |                                                 |      |      |      |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                                 |      |      |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                   |       |                                                 |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                                 |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 222                                                                                                                                                                                                                                                                                                                                                               |       |                                                 |      |      |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                       | B     | C                                               | D    | E    | FX   |
| 64,41                                                                                                                                                                                                                                                                                                                                                                                                                                   | 12,61 | 1,8                                             | 5,41 | 7,21 | 8,56 |
| <b>Lecturers:</b> RNDr. Michal Pospíšil, PhD., Mgr. Zuzana Šinská                                                                                                                                                                                                                                                                                                                                                                       |       |                                                 |      |      |      |
| <b>Last change:</b> 17.05.2022                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                                 |      |      |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                                                                                                                                                                                       |       |                                                 |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                 |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                 |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                 |
| <b>Course ID:</b><br>FMFI.KMANM/1-<br>FYZ-407/22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Course title:</b><br>Mathematics Classes (3) |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                               |                                                 |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                 |
| <b>Recommended semester:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                 |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                 |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                 |
| <b>Course requirements:</b><br>Active participation in the subject.<br>Grades: A (100-91), B (90-81), C (80-71), D (70-61), E (60-51), Fx (50-0).<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                 |                                                 |
| <b>Learning outcomes:</b><br>The student will have an overview of the use of curve and area integrals, potential theory. He will become actively acquainted with the methods and use of parametric integrals. He will actively control the work with Euler integrals. He will get acquainted with Fourier series and their use in solving physical problems of diffusion and potential theory.                                                                                                                                      |                                                 |
| <b>Class syllabus:</b><br>Support exercise for the course Mathematics (3):<br>Line integrals and potential of vector functions. Area integrals, Stokes and Gauss formulas. Parameter dependent integrals, their analytical properties. Euler integrals. Fourier series, convergence theorems, applications in linear diffusion theory. Fourier transform basic properties of Fourier transform, convergence of Fourier integral.<br>Giving a sufficient number of suggestions for homework and consulting solutions to these tasks. |                                                 |
| <b>Recommended literature:</b><br>Kľuvánek, Mišík, Švec, Matematika II, Alfa: Bratislava<br>Eliáš, Horváth, Kajan, Šulka, Zbierka úloh z vyššej matematiky (4), SNTL: Bratislava<br>Demidovič, Zbírka úloh z matematické analýsy, Praha<br>Demetrian, Fourierove rady a Fourierov integrál, Univerzita Komenského v Bratislave                                                                                                                                                                                                      |                                                 |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                 |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                 |

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|----------------------------------------------------------------------------------|------|-----|-----|------|------|
| <b>Past grade distribution</b>                                                   |      |     |     |      |      |
| Total number of evaluated students: 266                                          |      |     |     |      |      |
| A                                                                                | B    | C   | D   | E    | FX   |
| 92,48                                                                            | 0,38 | 1,5 | 0,0 | 0,75 | 4,89 |
| <b>Lecturers:</b> doc. RNDr. Michal Demetrian, PhD., RNDr. Michal Pospíšil, PhD. |      |     |     |      |      |
| <b>Last change:</b> 13.08.2022                                                   |      |     |     |      |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                |      |     |     |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |                                                 |       |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                                                 |       |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |                                                 |       |      |      |
| <b>Course ID:</b><br>FMFI.KMANM/1-FYZ-408/22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      | <b>Course title:</b><br>Mathematics Classes (4) |       |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                             |      |                                                 |       |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                                                 |       |      |      |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |                                                 |       |      |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |                                                 |       |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                                                 |       |      |      |
| <b>Recommended prerequisites:</b><br>1-FYZ-215 Mathematics (3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                                                 |       |      |      |
| <b>Course requirements:</b><br>Final evaluation based on the semestral evaluation from mandatory subject Mathematics 4 and attendance. 100 - 90 % A 89 - 80 % B 79 - 70 % C 69 - 55 % D 54 - 40 % E less than 40 % FX<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                           |      |                                                 |       |      |      |
| <b>Learning outcomes:</b><br>The student will be familiar with the methods and applications of the theory of functions of a complex variable.                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                                                 |       |      |      |
| <b>Class syllabus:</b><br>Complex numbers, complex plane. Stereographic projection. Paths, curves. Connected and linearly connected sets. The concept of convergence, limits, continuity and differentiability of functions of a complex variable. Conformal mappings. Curve integral of a function of complex variable. Closed paths integration theorems. Taylor and Laurent series. Properties of holomorphic functions. Isolated singular points of holomorphic functions. Residues and calculation of improper integrals. The argument principle and Rouché's theorem. Open mapping theorem. |      |                                                 |       |      |      |
| <b>Recommended literature:</b><br>M. Demetrian, Základy teórie funkcií komplexnej premennej - exercises                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                                                 |       |      |      |
| <b>Languages necessary to complete the course:</b><br>slovak, english                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                                                 |       |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                                                 |       |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 220                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                                                 |       |      |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | B    | C                                               | D     | E    | FX   |
| 60,45                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 4,55 | 8,64                                            | 10,91 | 7,27 | 8,18 |

|                                                                         |
|-------------------------------------------------------------------------|
| <b>Lecturers:</b> RNDr. Michal Pospíšil, PhD., Mgr. Július Pačuta, PhD. |
| <b>Last change:</b> 17.06.2022                                          |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                       |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                       |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                       |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                       |
| <b>Course ID:</b><br>FMFLKJFB+KTF/1-FYZ-111/15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Course title:</b><br>Mechanics (1) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 / 2 <b>per level/semester:</b> 52 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                       |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                       |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                       |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                       |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                       |
| <b>Course requirements:</b><br>Assessment during the semester: homeworks, written tests<br>Final exam: written test and oral exam<br>Approximate scale of final grades: A 90%, B 80%, C 70%, D 60%, E 50%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                       |
| <b>Learning outcomes:</b><br>Elementary knowledge of physics methodology, understanding the role of equation of motions, ability to solve simple equations of motion, simple numerical methods which can be used if analytical solution is not possible, orientation in basic terminology of mechanics like mass, energy, momentum, moment of inertia, frequency etc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                       |
| <b>Class syllabus:</b><br>Physical quantities and units<br>Kinematics of point-like objects, velocity, acceleration<br>Vector quantities, centripetal acceleration<br>Motion with constant acceleration<br>Motion in constant gravitational field, projectile motion, energy conservation law<br>Newton laws of mechanics<br>Law of inertial movement, inertial frame of reference, uniform straight line motion<br>law of force, numerical solution for ballistic curve<br>Fundamentals of physics methodology, state of a system, change of state, equation of motion<br>Rotation, angular velocity<br>momentum of a system of point objects, conservation law<br>angular momentum, conservation law<br>tensor of inertia, Newton laws for simple rotational movements<br>static friction, dynamic friction<br>equilibrium conditions<br>scalar product, work of arbitrary force<br>Newton gravitation law, gravitation potential, energy conservation<br>Kepler laws |                                       |

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| Circular motion in gravitation field<br>Harmonic oscillator<br>Hooks law for spring<br>Damped harmonic oscillator, resonance effect, lifetime/frequency uncertainty principle<br>Mathematical and physical pendulum |       |      |      |       |       |
| <b>Recommended literature:</b><br>Halliday, Resnick, Walker: Fundamentals of physics<br>Feynman lectures on physics                                                                                                 |       |      |      |       |       |
| <b>Languages necessary to complete the course:</b><br>English                                                                                                                                                       |       |      |      |       |       |
| <b>Notes:</b>                                                                                                                                                                                                       |       |      |      |       |       |
| <b>Past grade distribution</b><br>Total number of evaluated students: 459                                                                                                                                           |       |      |      |       |       |
| A                                                                                                                                                                                                                   | B     | C    | D    | E     | FX    |
| 18,74                                                                                                                                                                                                               | 10,68 | 9,59 | 8,06 | 21,35 | 31,59 |
| <b>Lecturers:</b> doc. RNDr. Martin Mojžiš, PhD., Mgr. Peter Maták, PhD.                                                                                                                                            |       |      |      |       |       |
| <b>Last change:</b> 11.04.2017                                                                                                                                                                                      |       |      |      |       |       |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                   |       |      |      |       |       |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                       |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                       |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                       |
| <b>Course ID:</b><br>FMFLKJFB+KTF/1-FYZ-112/15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Course title:</b><br>Mechanics (2) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 / 2 <b>per level/semester:</b> 52 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                       |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                       |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                       |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                       |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                       |
| <b>Course requirements:</b><br>Priebežné hodnotenie: domáce úlohy, písomka<br>Skúška: písomná a ústna<br>Orientačná stupnica hodnotenia: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 40/60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                       |
| <b>Learning outcomes:</b><br>Ability to work with physical systems with an infinite number of degrees of freedom, to understand the solution of a partial differential equation as an equation of motion, knowledge of basic concepts of hydromechanics, knowledge of basic concepts of molecular mechanics and thermodynamics, knowledge of thermodynamics applications in ideal classical gas, basic probability theory mathematical statistics in physics, understanding the basics of the theory of relativity                                                                                                                                                                                                                                                                                                                                                                         |                                       |
| <b>Class syllabus:</b><br>Elements of elasticity theory on the example of prism deformations, pressure and shear stress, Young's modulus.<br>Movement of coupled oscillators.<br>Chain of bound oscillators, continuous limit.<br>Wave equation and its solution, normal modes, Fourier decomposition.<br>Elastic waves in the continuum, sound, Doppler principle<br>Fluids, Pascal's law<br>Archimedes' law, Statics of fluids<br>Ideal fluid motion, Continuity equation, Bernoulli's equation<br>Calorimetry of incompressible fluid, the problem of what heat is.<br>Basic phenomenology of capillary and osmotic phenomena<br>History of the discovery of molecules by chemists.<br>Mol, Avogadro's constant, typical dimensions of the microworld<br>Phenomenology of gas processes, equation of state, Kelvin scale<br>Kinetic theory of gas pressure, energy temperature relation |                                       |

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| Macroscopic work of gas, heat as microscopic work, first law of thermodynamic<br>Mayer's relation, Adiabatic process<br>Data processing elements, arithmetic mean error<br>Data fitting, minimizing sum of squares, (chi-square distribution?).<br>Drunken sailor, related to fluctuations<br>Maxwell's velocity distribution<br>Boltzmann distribution and barometric formula<br>Elements of relativity theory                                                                                                                                                                                                                                                                                                                                                                       |       |       |       |       |       |
| <b>Recommended literature:</b><br>Physics part 1. Mechanics: University textbook of general physics / David Halliday, Robert Resnick, Jearl Walker; translated by Jana Musilová ... [et al.]. Brno: VUTIAM Technical University, 2000<br>Physics part 2. Mechanics - thermodynamics: University textbook of general physics / David Halliday, Robert Resnick, Jearl Walker; translated by Jan Obdržálek ... [et al.]. Brno: VUTIAM Technical University, 2000<br>General physics: 1: mechanics and molecular physics / Štefan Veis, Ján Maďar, Viktor Martišovič. Bratislava: Alfa, 1978<br>Physics for students at technical universities: 1: mechanics, acoustics, thermals / Dionýz Ilkovič. Bratislava: Alfa, 1972<br>Electronic texts and presentations on the subject's website |       |       |       |       |       |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |       |       |       |       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |       |       |       |       |
| <b>Past grade distribution</b><br>Total number of evaluated students: 286                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |       |       |       |       |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | B     | C     | D     | E     | FX    |
| 30,77                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 18,18 | 13,99 | 10,84 | 16,08 | 10,14 |
| <b>Lecturers:</b> doc. RNDr. Martin Mojžiš, PhD., Mgr. Peter Maták, PhD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |       |       |       |       |
| <b>Last change:</b> 18.05.2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |       |       |       |       |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |       |       |       |       |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                 |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                 |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                 |
| <b>Course ID:</b><br>FMFLKTF/1-FYZ-413/15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Course title:</b><br>Methods of Solving Physics Problems (1) |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                 |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                 |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                 |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                 |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                 |
| <b>Course requirements:</b><br>Work during semester: homework and problem solution in the class.<br>Weight of the exam: 0%.<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                 |
| <b>Learning outcomes:</b><br>Students will learn how to approach problems without any context of a given topic in the particular class. They will refresh the basic ideas and approaches from the first three semesters of the program, which are common across the areas of physics, and will learn several new ones.                                                                                                                                                                                                                                                                               |                                                                 |
| <b>Class syllabus:</b><br>The course is aimed at solving physics problems of various topics and difficulty. Sometimes those are problems that illustrate a specific approach to a class of physics problems, sometimes they are more aimed at recalling basics procedures in some area of physics. The main difference from the standard exercise sessions is that the problems come without any context of a particular subject and topics, thus the best approach to solving the problem is not given.<br>In the first installment of this class we look at topics from the first three semesters. |                                                                 |
| <b>Recommended literature:</b><br>Feynmanovy přednášky z fyziky s řešenými příklady 1/3 / Richard P. Feynman, Robert B. Leighton, Matthew Sands. Havlíčkův Brod : Fragment, 2001<br>Feynmanovy přednášky z fyziky s řešenými příklady : 2/3 / Richard P. Feynman, Robert B. Leighton, Matthew Sands. Havlíčkův Brod : Fragment, 2006<br>Úlohy predchádzajúcich ročníkov fyzikálnych súťaží.                                                                                                                                                                                                          |                                                                 |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                 |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                 |

|                                                   |      |      |     |     |     |
|---------------------------------------------------|------|------|-----|-----|-----|
| <b>Past grade distribution</b>                    |      |      |     |     |     |
| Total number of evaluated students: 96            |      |      |     |     |     |
| A                                                 | B    | C    | D   | E   | FX  |
| 97,92                                             | 1,04 | 1,04 | 0,0 | 0,0 | 0,0 |
| <b>Lecturers:</b> doc. Mgr. Juraj Tekel, PhD.     |      |      |     |     |     |
| <b>Last change:</b> 18.05.2022                    |      |      |     |     |     |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |      |      |     |     |     |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                               |     |                                                                 |     |     |     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                             |     |                                                                 |     |     |     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                               |     |                                                                 |     |     |     |
| <b>Course ID:</b><br>FMFL.KTF/1-FYZ-414/15                                                                                                                                                                                                                                                                                                                                                    |     | <b>Course title:</b><br>Methods of Solving Physics Problems (2) |     |     |     |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                         |     |                                                                 |     |     |     |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                   |     |                                                                 |     |     |     |
| <b>Recommended semester:</b> 7.                                                                                                                                                                                                                                                                                                                                                               |     |                                                                 |     |     |     |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                  |     |                                                                 |     |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                         |     |                                                                 |     |     |     |
| <b>Course requirements:</b><br>Work during semester: homework and problem solution in the class<br>Weight of the exam: 0%.<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                  |     |                                                                 |     |     |     |
| <b>Learning outcomes:</b><br>Students will learn how to approach problems without any context of a given topic in the particular class. They will refresh the basic ideas and approaches from the fourth and partly fifth semesters of the program, which are common across the areas of physics, and will learn several new ones.                                                            |     |                                                                 |     |     |     |
| <b>Class syllabus:</b><br>Similar to the first installment of the class, but with emphasis on more complicated topics from the first three semesters of the program, topics from the fourth semester and in the later stages also from the fifth semester.                                                                                                                                    |     |                                                                 |     |     |     |
| <b>Recommended literature:</b><br>Feynmanovy přednášky z fyziky s řešenými příklady 1/3 / Richard P. Feynman, Robert B. Leighton, Matthew Sands. Havlíčkův Brod : Fragment, 2001<br>Feynmanovy přednášky z fyziky s řešenými příklady : 2/3 / Richard P. Feynman, Robert B. Leighton, Matthew Sands. Havlíčkův Brod : Fragment, 2006<br>Problems from various physics exams and competitions. |     |                                                                 |     |     |     |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                         |     |                                                                 |     |     |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                 |     |                                                                 |     |     |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 33                                                                                                                                                                                                                                                                                                                      |     |                                                                 |     |     |     |
| A                                                                                                                                                                                                                                                                                                                                                                                             | B   | C                                                               | D   | E   | FX  |
| 100,0                                                                                                                                                                                                                                                                                                                                                                                         | 0,0 | 0,0                                                             | 0,0 | 0,0 | 0,0 |
| <b>Lecturers:</b> doc. Mgr. Juraj Tekel, PhD.                                                                                                                                                                                                                                                                                                                                                 |     |                                                                 |     |     |     |

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| <b>Last change:</b> 18.05.2022                    |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                         |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                         |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                         |
| <b>Course ID:</b><br>FMFL.KJFB/1-FYZ-601/15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Course title:</b><br>Nuclear Physics |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 / 2 <b>per level/semester:</b> 52 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                       |                                         |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                         |
| <b>Recommended semester:</b> 7.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                         |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                         |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                         |
| <b>Course requirements:</b><br>Evaluation during the semester: midterm test<br>Final evaluation: oral exam<br>Scale for final grades: A 90%, B 80%, C 70%, D 60%, E 50%                                                                                                                                                                                                                                                                                                                                                                                                        |                                         |
| <b>Learning outcomes:</b><br>The student gains the basic understanding of the nuclear and particle physics, for example, basic properties of atomic nuclei, their radioactive decay, nuclear reactions and basic properties of elementary particles.                                                                                                                                                                                                                                                                                                                           |                                         |
| <b>Class syllabus:</b><br>Properties of atomic nuclei. Basic nuclear models, the binding energy of atomic nuclei. Stability and decay of radioactive nuclei. Radioactive decay law. Alpha and beta decay. Nuclear fission. Interaction of charged particles and their detection.<br>Radioactivity in nature. Basic nuclear reactions. Production of unstable radioactive isotopes and their separation. Particle accelerator.<br>Elementary particles (leptons, quarks, interactions, unification theory). Quark model, QCD.<br>Basic astrophysical reactions. Nuclear fusion. |                                         |
| <b>Recommended literature:</b><br>Introductory nuclear physics / Kenneth S. Krane. Hoboken : Wiley, 1988<br>Introductory nuclear physics / P. E. Hodgson, E. Gadioli, E. Gadioli Erba. Oxford : Oxford University Press, 1997<br>Nuclear and particle physics / B. R. Martin. Chichester : John Wiley , 2006                                                                                                                                                                                                                                                                   |                                         |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                         |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                         |

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|-----------------------------------------------------------------------------|-------|-------|-------|------|------|
| <b>Past grade distribution</b>                                              |       |       |       |      |      |
| Total number of evaluated students: 62                                      |       |       |       |      |      |
| A                                                                           | B     | C     | D     | E    | FX   |
| 48,39                                                                       | 11,29 | 14,52 | 14,52 | 8,06 | 3,23 |
| <b>Lecturers:</b> doc. Mgr. Stanislav Antalic, PhD., Mgr. Boris Andel, PhD. |       |       |       |      |      |
| <b>Last change:</b> 21.06.2022                                              |       |       |       |      |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                           |       |       |       |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                              |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                              |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                              |
| <b>Course ID:</b><br>FMFLKTF/1-FYZ-226/22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Course title:</b><br>Numerical mathematics for physicists |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                              |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                              |
| <b>Recommended semester:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                              |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                              |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                              |
| <b>Course requirements:</b><br>Continuous assessment: numerical solution of assigned homework<br>Exam: written<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Credits will be awarded if the student obtains at least 50% points.<br>Scale of assessment (preliminary/final): Weight of the intermediate / final evaluation: 100/0                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                              |
| <b>Learning outcomes:</b><br>Students are able to create programs for numerical solution of selected physical problems.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                              |
| <b>Class syllabus:</b><br>Computer representation of numbers, errors of numerical calculations, solution of nonlinear equations, solution of systems of linear equations, iterative methods, approximation and interpolation of functions, Chebyshev polynomials, least squares method, numerical quadrature.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                              |
| <b>Recommended literature:</b><br>Recommended literature:<br>M.Nekvinda, J.Šrubař, J.Vild: Introduction to Numerical Mathematics, 1976; Anthony Ralston: Fundamentals of Numerical Mathematics, 1978; Emil Vitásek: Numerical Methods, 1987; Emil Vitásek: Numerical Mathematics II: Numerical Solution of Differential Equations, 1981; R.W. Hamming: Numerical methods for scientists and engineers, 1987; W.H.Press, S.A.Teukolsky, W.T.Vetterling, B.P.Flannery: Numerical recipes 3.ed, 2007; A.Ralston, P.Rabinowitz: A first course in numerical analysis, 2001;<br>R.W. Hamming: Numerical methods for scientists and engineers, 1987; W.H.Press, S.A.Teukolsky, W.T.Weterling, B.P.Flannery: Numerical recipes 3.ed, 2007; A.Ralston, P.Rabinowitz: A first course in numerical analysis, 2001; |                                                              |
| <b>Languages necessary to complete the course:</b><br>Slovak and English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                              |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                              |

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|-------------------------------------------------------------------------------------------------------|------|------|-----|-----|------|
| At least basic knowledge of programming in the programming language chosen by the student is assumed. |      |      |     |     |      |
| <b>Past grade distribution</b>                                                                        |      |      |     |     |      |
| Total number of evaluated students: 20                                                                |      |      |     |     |      |
| A                                                                                                     | B    | C    | D   | E   | FX   |
| 55,0                                                                                                  | 10,0 | 15,0 | 5,0 | 5,0 | 10,0 |
| <b>Lecturers:</b> RNDr. Eduard Masár, PhD.                                                            |      |      |     |     |      |
| <b>Last change:</b> 17.10.2022                                                                        |      |      |     |     |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                     |      |      |     |     |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                |
| <b>Course ID:</b><br>FMFI.KEF/1-FYZ-218/22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Course title:</b><br>Optics |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 3 / 1 <b>per level/semester:</b> 39 / 13<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                |
| <b>Course requirements:</b><br>Continuous assessment: test<br>Exam: oral, written<br>Indicative rating scale: A 90%, B 80%, C 70%, D 60%, E 50%.<br>Credits will be awarded if the student obtains at least 50% points.<br>Scale of assessment (preliminary/final): 40/60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                |
| <b>Learning outcomes:</b><br>Follow-up knowledge of electricity and magnetism, acquisition of basic knowledge of optics, both in the field of geometric optics and imaging, as well as in the field of wave optics and optical spectroscopy. study programs where optics and optical spectroscopy are used. The acquired knowledge will also be necessary for the preparation of the bachelor's thesis.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                |
| <b>Class syllabus:</b><br>Introduction. Light sources, character. Geometric optics and basics of optical imaging (Fermat's principle, Snell's law, imaging equation, lenses, lens errors, spherical mirrors, imaging equation, prism, light decomposition by a prism, simple optical instruments, matrix approach). Wave optics: 1 / introduction (Maxwell's equations, electromagnetic field energy, Poynting vector, radiation intensity, wave equations and speed of electromagnetic waves, Doppler effect), 2 / light interference (Young's experiment, coherence, light interference on thin films, wedges, Newton's rings, Michelson interferometer) 3 / light diffraction (Huyghens principle, Fresnel diffraction, Fraunhofer diffraction, diffraction grating) 4 / light propagation (light generation, light dispersion in dielectric, scattering, polarization, Fresnel relations, reflection and refractive polarization, light propagation anisotropic environments). Light absorption, emission and scattering. Fundamentals of optical spectroscopy. The principle of lasers. |                                |
| <b>Recommended literature:</b><br>Svetlo : Vlny, lúče, fotóny / A.Štrba, V.Mesároš, D. Senderáková. Nitra : Enigma, 2011<br>Optika s príkladmi I / A. Štrba, V. Mesároš, D. Senderáková. Bratislava : Univerzita Komenského, 1996                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                |

Fyzika část 4. Elektromagnetické vlny - optika - relativita : Vysokoškolská učebnice obecné fyziky / D. Halliday, R. Resnick, J. Walker ; přeložili J. Komrska ... [et al.]. Brno : Vysoké učení technické VUTÍUM, 2000  
 Physics : principles with applications / D.C. Giancoli. Upper Saddle River, N.J. : Pearson/Prentice Hall, 2005  
 E. Hecht, Optics, 5th Edition, Pearson 2016

**Languages necessary to complete the course:**

**Notes:**

**Past grade distribution**

Total number of evaluated students: 53

| A     | B     | C     | D     | E    | FX  |
|-------|-------|-------|-------|------|-----|
| 39,62 | 16,98 | 24,53 | 13,21 | 5,66 | 0,0 |

**Lecturers:** prof. RNDr. Pavel Veis, CSc., Mgr. Michaela Horňáčková, PhD.

**Last change:** 22.02.2022

**Approved by:** doc. RNDr. Tomáš Blažek, PhD.

## COURSE DESCRIPTION

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------------------------------------------------------|-----|------|------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                   |      |                                                             |     |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                 |      |                                                             |     |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                   |      |                                                             |     |      |      |
| <b>Course ID:</b><br>FMFI.KAI/2-MXX-132/23                                                                                                                                                        |      | <b>Course title:</b><br>Participation in Empirical Research |     |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> course<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning |      |                                                             |     |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                       |      |                                                             |     |      |      |
| <b>Recommended semester:</b> 2., 4., 6.                                                                                                                                                           |      |                                                             |     |      |      |
| <b>Educational level:</b> I., I.II., II.                                                                                                                                                          |      |                                                             |     |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                             |      |                                                             |     |      |      |
| <b>Course requirements:</b>                                                                                                                                                                       |      |                                                             |     |      |      |
| <b>Learning outcomes:</b>                                                                                                                                                                         |      |                                                             |     |      |      |
| <b>Class syllabus:</b>                                                                                                                                                                            |      |                                                             |     |      |      |
| <b>Recommended literature:</b>                                                                                                                                                                    |      |                                                             |     |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                |      |                                                             |     |      |      |
| <b>Notes:</b>                                                                                                                                                                                     |      |                                                             |     |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 202                                                                                                                         |      |                                                             |     |      |      |
| A                                                                                                                                                                                                 | B    | C                                                           | D   | E    | FX   |
| 89,6                                                                                                                                                                                              | 1,49 | 1,49                                                        | 0,0 | 2,97 | 4,46 |
| <b>Lecturers:</b> Mgr. Xenia Daniela Poslon, PhD.                                                                                                                                                 |      |                                                             |     |      |      |
| <b>Last change:</b> 06.09.2023                                                                                                                                                                    |      |                                                             |     |      |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                 |      |                                                             |     |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                   |      |                                                             |     |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                 |      |                                                             |     |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                   |      |                                                             |     |      |      |
| <b>Course ID:</b><br>FMFI.KAI/2-MXX-132/23                                                                                                                                                        |      | <b>Course title:</b><br>Participation in Empirical Research |     |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> course<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning |      |                                                             |     |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                       |      |                                                             |     |      |      |
| <b>Recommended semester:</b> 1., 3., 5.                                                                                                                                                           |      |                                                             |     |      |      |
| <b>Educational level:</b> I., I.II., II.                                                                                                                                                          |      |                                                             |     |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                             |      |                                                             |     |      |      |
| <b>Course requirements:</b>                                                                                                                                                                       |      |                                                             |     |      |      |
| <b>Learning outcomes:</b>                                                                                                                                                                         |      |                                                             |     |      |      |
| <b>Class syllabus:</b>                                                                                                                                                                            |      |                                                             |     |      |      |
| <b>Recommended literature:</b>                                                                                                                                                                    |      |                                                             |     |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                |      |                                                             |     |      |      |
| <b>Notes:</b>                                                                                                                                                                                     |      |                                                             |     |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 202                                                                                                                         |      |                                                             |     |      |      |
| A                                                                                                                                                                                                 | B    | C                                                           | D   | E    | FX   |
| 89,6                                                                                                                                                                                              | 1,49 | 1,49                                                        | 0,0 | 2,97 | 4,46 |
| <b>Lecturers:</b> Mgr. Xenia Daniela Poslon, PhD.                                                                                                                                                 |      |                                                             |     |      |      |
| <b>Last change:</b> 06.09.2023                                                                                                                                                                    |      |                                                             |     |      |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                 |      |                                                             |     |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                                                          |     |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                                                          |     |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                                                          |     |      |      |
| <b>Course ID:</b><br>FMFL.KTV/1-MXX-110/00                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      | <b>Course title:</b><br>Physical Education and Sport (1) |     |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                        |      |                                                          |     |      |      |
| <b>Number of credits:</b> 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                                                          |     |      |      |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                                                          |     |      |      |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |                                                          |     |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                                                          |     |      |      |
| <b>Course requirements:</b><br>Grades: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                            |      |                                                          |     |      |      |
| <b>Learning outcomes:</b><br>Orientation in the history of the selected sports discipline, mastering the basic principles of compensation of mostly mental burdens of the individual. Creating a positive, lasting relationship to physical education and sports in the sense of calocagation. Mastering the demands for the development of motor abilities, skills, proper technique of performing individual movements in individual sports, individual game activities in collective sports games. |      |                                                          |     |      |      |
| <b>Class syllabus:</b><br>Introduction to the basic history of the selected sport, with the basic principles of compensation of one-sided psychological burden of the individual's body. Development of basic motor skills with a stop to all kinds of endurance, coordination, increasing the level of joint mobility. Training of individual game activities in collective sports games. In individual sports disciplines, practice of basic techniques of individual elements.                     |      |                                                          |     |      |      |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                                                          |     |      |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                                                          |     |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                                                          |     |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 7493                                                                                                                                                                                                                                                                                                                                                                                                                            |      |                                                          |     |      |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | B    | C                                                        | D   | E    | FX   |
| 92,81                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1,52 | 0,23                                                     | 0,0 | 0,08 | 5,37 |
| <b>Lecturers:</b> Mgr. Ladislav Mókus, PaedDr. Dana Mašlejová, Mgr. Jana Leginusová, Mgr. Tomáš Kuchár, PhD., PaedDr. Mikuláš Ortutay, Mgr. Martin Dovičák, PhD., Mgr. Júlia Raábová, PhD.,                                                                                                                                                                                                                                                                                                           |      |                                                          |     |      |      |

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| Mgr. Branislav Nedbálek, PhD., Mgr. Tomáš Lovecký, Mgr. Martina Maheľová, PaedDr. Lucia Ondrušová |
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| <b>Last change:</b> 16.06.2022 |
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| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |
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## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |     |                                                          |      |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |                                                          |      |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |     |                                                          |      |      |      |
| <b>Course ID:</b><br>FMFI.KTV/1-MXX-120/22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |     | <b>Course title:</b><br>Physical Education and Sport (2) |      |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                  |     |                                                          |      |      |      |
| <b>Number of credits:</b> 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |                                                          |      |      |      |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |     |                                                          |      |      |      |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |     |                                                          |      |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |                                                          |      |      |      |
| <b>Course requirements:</b><br>Grades: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                                             |     |                                                          |      |      |      |
| <b>Learning outcomes:</b><br>Addressing a positive and lasting relationship with physical education and sport by understanding the importance of physical development and maintaining its optimal level throughout life. The use of strength and other motor skills to more rationally manage the game activities of the individual, while improving the acquisition of more complex elements of technology. In everyday life in providing basic necessities.                                                                                                          |     |                                                          |      |      |      |
| <b>Class syllabus:</b><br>Completing a positive lasting relationship to physical education and sport. Development of motor skills with a focus on the development of strength, with an emphasis on dynamic strength and endurance in strength. In collective sports games, improving individual game activities, practicing basic game combinations, playing with modified rules, tasked games. In individual sports disciplines, the development of motor abilities and skills necessary for the acquisition of more complex elements of lower difficulty techniques. |     |                                                          |      |      |      |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |                                                          |      |      |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |                                                          |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |     |                                                          |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 5850                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |     |                                                          |      |      |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | B   | C                                                        | D    | E    | FX   |
| 95,61                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1,5 | 0,14                                                     | 0,09 | 0,05 | 2,62 |
| <b>Lecturers:</b> Mgr. Tomáš Kuchár, PhD., PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, Mgr. Jana Leginusová, PaedDr. Mikuláš Ortutay, Mgr. Martin Dovičák, PhD., Mgr. Júlia Raábová, PhD.,                                                                                                                                                                                                                                                                                                                                                                            |     |                                                          |      |      |      |

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| Mgr. Branislav Nedbálek, PhD., Mgr. Tomáš Lovecký, Mgr. Martina Maheľová, PaedDr. Lucia Ondrušová |
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| <b>Last change:</b> 15.03.2022 |
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| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |
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## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                               |      |                                                          |      |     |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                             |      |                                                          |      |     |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                               |      |                                                          |      |     |      |
| <b>Course ID:</b><br>FMFL.KTV/1-MXX-210/00                                                                                                                                                                                                                                                    |      | <b>Course title:</b><br>Physical Education and Sport (3) |      |     |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                         |      |                                                          |      |     |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                   |      |                                                          |      |     |      |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                               |      |                                                          |      |     |      |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                                                                           |      |                                                          |      |     |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                         |      |                                                          |      |     |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                 |      |                                                          |      |     |      |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                     |      |                                                          |      |     |      |
| <b>Class syllabus:</b><br>To practise game combinations, tactical - mechanical elements in basketball, volleyball, soccer, floorball, ice hockey, badminton, competition rules in the sports specialization.                                                                                  |      |                                                          |      |     |      |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                |      |                                                          |      |     |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                         |      |                                                          |      |     |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                 |      |                                                          |      |     |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 3440                                                                                                                                                                                                                    |      |                                                          |      |     |      |
| A                                                                                                                                                                                                                                                                                             | B    | C                                                        | D    | E   | FX   |
| 98,14                                                                                                                                                                                                                                                                                         | 0,44 | 0,09                                                     | 0,03 | 0,0 | 1,31 |
| <b>Lecturers:</b> Mgr. Tomáš Kuchár, PhD., Mgr. Jana Leginusová, PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, PaedDr. Mikuláš Ortutay, Mgr. Martin Dovičák, PhD., Mgr. Júlia Raábová, PhD., Mgr. Branislav Nedbálek, PhD., Mgr. Tomáš Lovecký, Mgr. Martina Maheľová, PaedDr. Lucia Ondrušová |      |                                                          |      |     |      |
| <b>Last change:</b> 16.06.2022                                                                                                                                                                                                                                                                |      |                                                          |      |     |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                                             |      |                                                          |      |     |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                               |      |                                                          |      |     |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                             |      |                                                          |      |     |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                               |      |                                                          |      |     |      |
| <b>Course ID:</b><br>FMFI.KTV/1-MXX-220/00                                                                                                                                                                                                                                                    |      | <b>Course title:</b><br>Physical Education and Sport (4) |      |     |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                |      |                                                          |      |     |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                   |      |                                                          |      |     |      |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                               |      |                                                          |      |     |      |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                                                                           |      |                                                          |      |     |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                         |      |                                                          |      |     |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                 |      |                                                          |      |     |      |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                     |      |                                                          |      |     |      |
| <b>Class syllabus:</b><br>Preparation for sport championships of the Faculty in the chosen sport at modified rules. The selection of talented students into the teams of the University and Faculty leagues and other faculty sport events.                                                   |      |                                                          |      |     |      |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                |      |                                                          |      |     |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                         |      |                                                          |      |     |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                 |      |                                                          |      |     |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 2957                                                                                                                                                                                                                    |      |                                                          |      |     |      |
| A                                                                                                                                                                                                                                                                                             | B    | C                                                        | D    | E   | FX   |
| 97,94                                                                                                                                                                                                                                                                                         | 0,17 | 0,1                                                      | 0,03 | 0,0 | 1,76 |
| <b>Lecturers:</b> Mgr. Tomáš Kuchár, PhD., Mgr. Ladislav Mókus, Mgr. Jana Leginusová, PaedDr. Dana Mašlejová, PaedDr. Mikuláš Ortutay, Mgr. Martin Dovičák, PhD., Mgr. Júlia Raábová, PhD., Mgr. Branislav Nedbálek, PhD., Mgr. Tomáš Lovecký, Mgr. Martina Maheľová, PaedDr. Lucia Ondrušová |      |                                                          |      |     |      |
| <b>Last change:</b> 15.03.2022                                                                                                                                                                                                                                                                |      |                                                          |      |     |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                                             |      |                                                          |      |     |      |

## COURSE DESCRIPTION

|                                                                                                                                                                                                                                                                                               |      |                                                          |     |     |      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----------------------------------------------------------|-----|-----|------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                               |      |                                                          |     |     |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                             |      |                                                          |     |     |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                               |      |                                                          |     |     |      |
| <b>Course ID:</b><br>FMFL.KTV/1-MXX-310/00                                                                                                                                                                                                                                                    |      | <b>Course title:</b><br>Physical Education and Sport (5) |     |     |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                         |      |                                                          |     |     |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                   |      |                                                          |     |     |      |
| <b>Recommended semester:</b> 5.                                                                                                                                                                                                                                                               |      |                                                          |     |     |      |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                                                                           |      |                                                          |     |     |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                         |      |                                                          |     |     |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                 |      |                                                          |     |     |      |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                     |      |                                                          |     |     |      |
| <b>Class syllabus:</b><br>Preparation and participation of individuals and teams in the system of university sport competitions and sport events.                                                                                                                                             |      |                                                          |     |     |      |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                |      |                                                          |     |     |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                         |      |                                                          |     |     |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                 |      |                                                          |     |     |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 2264                                                                                                                                                                                                                    |      |                                                          |     |     |      |
| A                                                                                                                                                                                                                                                                                             | B    | C                                                        | D   | E   | FX   |
| 98,63                                                                                                                                                                                                                                                                                         | 0,35 | 0,09                                                     | 0,0 | 0,0 | 0,93 |
| <b>Lecturers:</b> Mgr. Tomáš Kuchár, PhD., Mgr. Ladislav Mókus, Mgr. Jana Leginusová, PaedDr. Dana Mašlejová, PaedDr. Mikuláš Ortutay, Mgr. Martin Dovičák, PhD., Mgr. Júlia Raábová, PhD., Mgr. Branislav Nedbálek, PhD., Mgr. Tomáš Lovecký, Mgr. Martina Maheľová, PaedDr. Lucia Ondrušová |      |                                                          |     |     |      |
| <b>Last change:</b> 15.03.2022                                                                                                                                                                                                                                                                |      |                                                          |     |     |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                                             |      |                                                          |     |     |      |

## COURSE DESCRIPTION

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----------------------------------------------------------|-----|-----|------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                               |      |                                                          |     |     |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                             |      |                                                          |     |     |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                               |      |                                                          |     |     |      |
| <b>Course ID:</b><br>FMFI.KTV/1-MXX-320/22                                                                                                                                                                                                                                                    |      | <b>Course title:</b><br>Physical Education and Sport (6) |     |     |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                |      |                                                          |     |     |      |
| <b>Number of credits:</b> 1                                                                                                                                                                                                                                                                   |      |                                                          |     |     |      |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                                                                               |      |                                                          |     |     |      |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                                                                           |      |                                                          |     |     |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                         |      |                                                          |     |     |      |
| <b>Antirequisites:</b> FMFI.KTV/1-MXX-320/00                                                                                                                                                                                                                                                  |      |                                                          |     |     |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                 |      |                                                          |     |     |      |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                     |      |                                                          |     |     |      |
| <b>Class syllabus:</b><br>Using the communication in the physical education and sport and organizing the sport championships to achieve expressive motion of the sport and health in a valuable orientation the students.                                                                     |      |                                                          |     |     |      |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                |      |                                                          |     |     |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                         |      |                                                          |     |     |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                 |      |                                                          |     |     |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 205                                                                                                                                                                                                                     |      |                                                          |     |     |      |
| A                                                                                                                                                                                                                                                                                             | B    | C                                                        | D   | E   | FX   |
| 94,63                                                                                                                                                                                                                                                                                         | 0,49 | 0,49                                                     | 0,0 | 0,0 | 4,39 |
| <b>Lecturers:</b> PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, Mgr. Jana Leginusová, Mgr. Tomáš Kuchár, PhD., PaedDr. Mikuláš Ortutay, Mgr. Martin Dovičák, PhD., Mgr. Júlia Raábová, PhD., Mgr. Branislav Nedbálek, PhD., Mgr. Tomáš Lovecký, Mgr. Martina Maheľová, PaedDr. Lucia Ondrušová |      |                                                          |     |     |      |
| <b>Last change:</b> 15.03.2022                                                                                                                                                                                                                                                                |      |                                                          |     |     |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                                             |      |                                                          |     |     |      |

## STATE EXAM DESCRIPTION

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                |                                 |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                              |                                 |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                |                                 |
| <b>Course ID:</b><br>FMFI.KJFB/1-FYZ-951/15                                                                                                                                                                                                                                    | <b>Course title:</b><br>Physics |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                    |                                 |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                   |                                 |
| <b>Course requirements:</b><br>Exam: State exam<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 0/100                                                                                                            |                                 |
| <b>Learning outcomes:</b><br>Passing the state exam                                                                                                                                                                                                                            |                                 |
| <b>Class syllabus:</b><br>State exam consisting of two blocks:<br>1. Block of classical physics (mechanics, electromagnetism, optics)<br>2. Block of quantum physics (quantum theory, statistical physics of thermodynamics)<br>A detailed syllabus is on the faculty website. |                                 |
| <b>State exam syllabus:</b>                                                                                                                                                                                                                                                    |                                 |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                          |                                 |
| <b>Last change:</b> 18.05.2022                                                                                                                                                                                                                                                 |                                 |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                              |                                 |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                     |
| <b>Course ID:</b><br>FMFI.KAFZM/1-FYZ-477/19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Course title:</b><br>Physics of the Planet Earth |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 / 2 <b>per level/semester:</b> 52 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                     |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                     |
| <b>Recommended semester:</b> 7.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                     |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                     |
| <b>Antirequisites:</b> FMFI.KAFZM+KAMŠ/1-FYZ-476/15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                     |
| <b>Course requirements:</b><br>Continuous assessment based on discussions.<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                     |
| <b>Learning outcomes:</b><br>Students will gain basic knowledge about the structure and physical processes in the Earth and the surrounding space. The explanation of these processes will be based on the knowledge gained in basic physics courses (mechanics, electricity and magnetism, electromagnetic field theory, thermodynamics).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                     |
| <b>Class syllabus:</b> <ol style="list-style-type: none"> <li>1. How the Earth originated and what is its internal structure.</li> <li>2. Tides and dynamics of Earth-Moon coexistence.</li> <li>3. Seismic waves and the most precise physical model of the Earth.</li> <li>4. Why has the Earth its magnetic field? What will be the magnetic field in future like?</li> <li>5. Electric currents in the Earth and its surroundings. Electromagnetic sounding of the Earth.</li> <li>6. Measurements of physical parameters - from archeologic findings to the deep Earth's interior.</li> <li>7. Excursion</li> <li>8. Earthquakes, tsunami and seismic hazard.</li> <li>9. Earthquakes induced by human activity and the increase of seismic hazard.</li> <li>10. Aurora, ionosphere and magnetosphere of the Earth and planets.</li> <li>11. Electromagnetic rezonances in the Earth's atmosphere.</li> <li>12. Sources of heat and heat flux in the Earth. Is the Earth going to overheat or is it growing cold?</li> </ol> |                                                     |
| <b>Recommended literature:</b><br>Lectures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                     |
| <b>Languages necessary to complete the course:</b><br>Slovak                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                     |

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------|-------|-----|------|
| <b>Past grade distribution</b>                                                                                                                                                    |      |       |       |     |      |
| Total number of evaluated students: 13                                                                                                                                            |      |       |       |     |      |
| A                                                                                                                                                                                 | B    | C     | D     | E   | FX   |
| 53,85                                                                                                                                                                             | 7,69 | 15,38 | 15,38 | 0,0 | 7,69 |
| <b>Lecturers:</b> prof. RNDr. Peter Moczo, DrSc., RNDr. Adriena Ondrášková, PhD., doc. RNDr. Sebastián Ševčík, CSc., doc. Mgr. Jozef Kristek, DrSc., MSc. Jaroslav Valovčan, PhD. |      |       |       |     |      |
| <b>Last change:</b> 08.03.2022                                                                                                                                                    |      |       |       |     |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                 |      |       |       |     |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                 |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                 |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                 |
| <b>Course ID:</b><br>FMFI.KJFB/1-FYZ-322/22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Course title:</b><br>Practical in atomic and nuclear physics |
| <b>Educational activities:</b><br><b>Type of activities:</b> laboratory practicals / independent work<br><b>Number of hours:</b><br><b>per week:</b> 2 / 1 <b>per level/semester:</b> 26 / 13<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                 |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                 |
| <b>Recommended semester:</b> 8.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                 |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                 |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                 |
| <b>Recommended prerequisites:</b><br>1-FYZ-231/22 Introduction to Modern Physics (Physics 2/S)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                 |
| <b>Course requirements:</b><br>Interim evaluation: elaboration of exercise protocols<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                 |
| <b>Learning outcomes:</b><br>Gain experimental skills with used instrumentation, registration of ionizing radiation and processing of measured data. In the realized experiments, make sure of the agreement of experiments and theories that clarify them.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                 |
| <b>Class syllabus:</b><br>In the introductory exercise, students will get acquainted with the methods used to process electrical pulses from ionizing radiation detectors (differential discriminator, single-channel and multi-channel analyzer). Separate laboratory exercises follow<br>- from atomic physics: Franck-Hertz experiment (verification of Bohr's postulates), Stefan-Boltzmann's law (radiation of an absolutely black body), range of alpha particles in air (principles of semiconductor detectors)<br>- from nuclear physics: statistical nature of nuclear transformations, determination of gamma radiation energy (principles of scintillation detectors), verification of Compton scattering<br>- from applied nuclear physics: measurement of air radioactivity (principles of Geiger-Müller detectors). |                                                                 |
| <b>Recommended literature:</b><br>- instructions for exercises at <a href="http://www.dnp.fmph.uniba.sk/~kollar/navodnik.htm">http://www.dnp.fmph.uniba.sk/~kollar/navodnik.htm</a><br>- Physics practicum IV: Atomic physics and ionizing radiation detection / Matej Florek ... [et al.]. Bratislava: Comenius University, 1988                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                 |
| <b>Languages necessary to complete the course:</b><br>Slovak, English.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                 |

**Notes:**

Recommended range of instruction (in hours): 39

Weekly: 2P + 1H Period of study: 27 P (9 weeks x3h) +12 H (4 weeks x3h)

**Past grade distribution**

Total number of evaluated students: 38

| A     | B     | C   | D   | E    | FX  |
|-------|-------|-----|-----|------|-----|
| 81,58 | 13,16 | 0,0 | 0,0 | 5,26 | 0,0 |

**Lecturers:** doc. RNDr. Monika Müllerová, PhD., doc. RNDr. Miroslav Ješkovský, PhD., RNDr. Miroslav Pikna, PhD., RNDr. Terézia Eckertová, PhD.

**Last change:** 24.02.2022

**Approved by:** doc. RNDr. Tomáš Blažek, PhD.

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                |
| <b>Course ID:</b><br>FMFI.KEF/1-FYZ-222/22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Course title:</b><br>Practical in electricity and magnetism |
| <b>Educational activities:</b><br><b>Type of activities:</b> laboratory practicals / independent work<br><b>Number of hours:</b><br><b>per week:</b> 2 / 1 <b>per level/semester:</b> 26 / 13<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                |
| <b>Prerequisites:</b> FMFI.KEF/1-FYZ-217/22 - Electromagnetism or FMFI.KEF/1-TEF-204/22 - Electricity and Magnetism                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                |
| <b>Course requirements:</b><br>Interim evaluation: elaboration of practical papers,<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                |
| <b>Learning outcomes:</b><br>Acquisition of skills in registration and data processing by computer, measurement of electrical and magnetic quantities. Physical interpretation and written / graphic presentation of processed results.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                |
| <b>Class syllabus:</b><br>In the initial two or three exercises, joint acquisition of skills and measurement with analog and digital devices (oscilloscope, digital multimeter, A / D converter), processing of measured data by computer. This is followed by five to six separate laboratory works on electricity and magnetism selected from the offer: electrical properties of substances - electric bridges, Hall effect; electric field mapping; magnetic field mapping - air coils; electromagnetic induction - transformer; electrical RLC oscillations - transient RLC phenomenon, serial and parallel RLC circuit; magnetic properties of substances - hysteresis loops, permeability of substances, separation of magnetic losses; fuel cell; determination of the specific charge of an electron ( $e / m_0$ ). |                                                                |
| <b>Recommended literature:</b><br>- e-learning systém k predmetu s aktualizovanými podkladmi k experimentom<br>- Fyzikálne praktikum II : Návodý na praktické cvičenia z elektriny a magnetizmu / Ján Pavlík.<br>Bratislava : Univerzita Komenského, 2002<br>- Elektromagnetizmus, Andrej Tirpák, Bratislava: Polygrafia SAV, 1999                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                |
| <b>Languages necessary to complete the course:</b><br>Slovak, English (designations of instrument controls and their manuals)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                |
| <b>Notes:</b><br>Recommended range of instruction (in hours): 39<br>Weekly: 2P + 1H Period of study: 27 P (9 weeks x3h) +12 H (4 weeks x3h)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                |

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| <b>Past grade distribution</b>                                                                                                                                                                                                             |       |      |      |      |      |
| Total number of evaluated students: 86                                                                                                                                                                                                     |       |      |      |      |      |
| A                                                                                                                                                                                                                                          | B     | C    | D    | E    | FX   |
| 60,47                                                                                                                                                                                                                                      | 26,74 | 3,49 | 2,33 | 2,33 | 4,65 |
| <b>Lecturers:</b> doc. RNDr. Tomáš Roch, Dr. techn., Mgr. Branislav Grančič, PhD., Ing. Pavol Ďurina, PhD., doc. RNDr. Juraj Országh, PhD., Mgr. Leonid Satrapinsky, PhD., Mgr. Ľubomír Staňo, PhD., Mgr. Veronika Hidaši Turiničová, PhD. |       |      |      |      |      |
| <b>Last change:</b> 21.06.2022                                                                                                                                                                                                             |       |      |      |      |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                          |       |      |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                      |
| <b>Course ID:</b><br>FMFI.KEF/1-FYZ-221/22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Course title:</b><br>Practical in mechanics and molecular physics |
| <b>Educational activities:</b><br><b>Type of activities:</b> laboratory practicals / independent work<br><b>Number of hours:</b><br><b>per week:</b> 2 / 1 <b>per level/semester:</b> 26 / 13<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                      |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                      |
| <b>Recommended semester:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                      |
| <b>Course requirements:</b><br>Continuous assessment: control of preparation for the internship, elaboration of reports from internships<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): Weight of the intermediate / final evaluation: 100/0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                      |
| <b>Learning outcomes:</b><br>Deepening and use of theoretical knowledge of mechanics and molecular physics, mastering basic physical measurement methods. The student will master the basic habits of independent scientific work in physical research: working with literature, keeping laboratory protocol, obtaining experimental erudition, critical evaluation of measurement and physical interpretation of processed results, written processing of individual physical problems in the form of a paper.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                      |
| <b>Class syllabus:</b><br>In practice, students will gain skills in experimental verification of some basic physical laws (gravitational, Hook's, equation of state, etc.), quantitative investigation of physical events (state changes, oscillations, polytropic action, etc.) and measurement of some basic physical quantities (modules elasticity, density, viscosity, speed of sound, air humidity, surface tension, gravitational constant, gravitational acceleration,...).<br>Tasks: Density measurement. Measurement of modulus of elasticity. Vibrations of coupled pendulums. Measurement of gravity acceleration. Moment of inertia measurement. Gravitational constant measurement. Heat capacity measurement. Group heat measurement. Determination of dynamic viscosity of fluids. Measurement of dynamic viscosity of liquids by commercial viscometers. The fall of a sphere in a confined gaseous environment. Polytropic story. Determination of surface tension of liquids. Measurement of relative and absolute humidity. Measuring the speed of sound in air. Basic properties of oscillating motion.<br>Some tasks are equipped with sensors and transducers that allow the registration and processing of measured data by computers. For some tasks, conventional measuring instruments and aids are used. |                                                                      |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                      |

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| Practicum in Mechanics and Molecular Physics / Nadežda Zrubáková, Elena Brežná, Božena Pisoňová. Bratislava: Comenius University, 2003<br>Practicum in Mechanics and Molecular Physics / Nadežda Zrubáková, Elena Brežná, Božena Pisoňová. Bratislava: Comenius University, 1999 |       |      |      |      |     |
| <b>Languages necessary to complete the course:</b><br>Slovak and English                                                                                                                                                                                                         |       |      |      |      |     |
| <b>Notes:</b><br>Recommended range of instruction (in hours): 39<br>Weekly: 2P + 1H Period of study: 27 P (9 weeks x3h) +12 H (4 weeks x3h)                                                                                                                                      |       |      |      |      |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 119                                                                                                                                                                                                        |       |      |      |      |     |
| A                                                                                                                                                                                                                                                                                | B     | C    | D    | E    | FX  |
| 63,87                                                                                                                                                                                                                                                                            | 15,13 | 9,24 | 2,52 | 0,84 | 8,4 |
| <b>Lecturers:</b> doc. RNDr. Juraj Országh, PhD., doc. RNDr. Veronika Medvecká, PhD., RNDr. Ladislav Moravský, PhD., doc. RNDr. Anna Zahoranová, PhD., doc. Mgr. Dušan Kováčik, PhD.                                                                                             |       |      |      |      |     |
| <b>Last change:</b> 22.02.2022                                                                                                                                                                                                                                                   |       |      |      |      |     |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                                |       |      |      |      |     |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                             |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                             |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                             |
| <b>Course ID:</b><br>FMFI.KEF/1-FYZ-321/22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Course title:</b><br>Practical in optics |
| <b>Educational activities:</b><br><b>Type of activities:</b> laboratory practicals / independent work<br><b>Number of hours:</b><br><b>per week:</b> 2 / 1 <b>per level/semester:</b> 26 / 13<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                             |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                             |
| <b>Recommended semester:</b> 7.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                             |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                             |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                             |
| <b>Recommended prerequisites:</b><br>1-FYZ-218/22 Optics (Physics 2/S), or 1-UFY-210/00 Waves and Optics (Physics Teacher Training in combination 2/S), or 1-TEF-205 Optics (Technical Physics 2/S)<br>or 1-FYZ-211/17 Electromagnetism and Optics (Physics 2/W)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                             |
| <b>Course requirements:</b><br>Interim evaluation: elaboration of practical papers<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                             |
| <b>Learning outcomes:</b><br>Physical interpretation and written / graphic presentation of processed results.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                             |
| <b>Class syllabus:</b><br>Through a series of measurements, we get acquainted with basic concepts and phenomena such as: light sources - radiation - reflectivity - absorption - photometry - basic photometric quantities. Next, we examine phenomena such as - light interference (two-beam interference, multi-beam interference), diffraction, light dispersion, refractive index, light polarization, optical activity. From the lecture we will repeat the basics of optical imaging - geometric optics and explain the construction of selected optical instruments, such as: photometer, microscope, telescope, monochromator, spectrometer, refractometer, interferometer, etc.) Some will be constructed and their parameters verified. We will measure some basic physical constants.<br>Each mathematical formulation of the investigated physical dependence (phenomenon) can be transformed into a certain measurable dependence (dependent on the so-called parameters). These are usually of various importance in terms of the phenomenon under study. In addition to storing the measured data, it is appropriate to display the measured data continuously graphically, which allows, especially when compared with the expected functional dependence, better visual inspection and more prompt detection and possible elimination of found errors.<br>There is a computer for each task. It includes instructions for the task, a program for evaluating measurements and graphical display of measured data and a program for a virtual experiment in |                                             |

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| the case of distance learning or. the need to carry out a parallel experiment to better understand the phenomenon. The measured tasks and their selection can be adapted to the respective field of study.                                                              |       |      |     |     |     |
| <b>Recommended literature:</b><br>- Web = instructions for the subject with updated data for experiments<br>- Pavel Vojtek: Practical exercises in optics, MFF UK, 1992, scripts<br>- Štrba A., Mesároš V., Senderáková D.: Optics with Examples, MFF UK, 1996, scripts |       |      |     |     |     |
| <b>Languages necessary to complete the course:</b><br>Slovak, English (designations of instrument controls and their manuals)                                                                                                                                           |       |      |     |     |     |
| <b>Notes:</b><br>Recommended range of instruction (in hours): 39<br>Weekly: 2P + 1H Period of study: 27 P (9 weeks x3h) +12 H (4 weeks x3h)                                                                                                                             |       |      |     |     |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 63                                                                                                                                                                                                |       |      |     |     |     |
| A                                                                                                                                                                                                                                                                       | B     | C    | D   | E   | FX  |
| 76,19                                                                                                                                                                                                                                                                   | 22,22 | 1,59 | 0,0 | 0,0 | 0,0 |
| <b>Lecturers:</b> RNDr. Ján Greguš, PhD., Mgr. Michaela Hornáčková, PhD., RNDr. Pavel Vojtek, CSc., RNDr. Zuzana Zábudlá, Mgr. Branislav Grančič, PhD.                                                                                                                  |       |      |     |     |     |
| <b>Last change:</b> 22.02.2022                                                                                                                                                                                                                                          |       |      |     |     |     |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                       |       |      |     |     |     |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                            |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                            |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                            |
| <b>Course ID:</b><br>FMFLKTF/1-FYZ-310/15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Course title:</b><br>Quantum Theory (1) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 / 2 <b>per level/semester:</b> 52 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                            |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                            |
| <b>Recommended semester:</b> 7.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                            |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                            |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                            |
| <b>Recommended prerequisites:</b><br>1-FYZ-231/22 Úvod do modernej fyziky<br>(Introduction to Modern Physics Course)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                            |
| <b>Course requirements:</b><br>Grades obtained during the semester are based on solutions to 10 or 11 homework problem sets and midterm exam<br>Final Exam: written exam<br>Marks: A 70%+ max grade, B 60%+ max grade, C 50%+ max grade, D 40%+ max grade, E 33% + max grade<br>Scale of assessment (preliminary/final): 40/60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                            |
| <b>Learning outcomes:</b><br>Learning the basic ideas of quantum mechanics and limitations of macroscopic classical physics. Acquiring knowledge of elementary mathematical formalism and problem solving skills. Developing physics thinking required to control quantum systems.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                            |
| <b>Class syllabus:</b><br>Introduction: from the "one meter" dimension to the dimension of atoms. Atomic nuclei, nucleons and quarks. Standard Model of elementary particles. Uncertainty principle. Stability of atoms and origin of their typical size and typical binding energy. Typical size and typical binding energy of the atomic nucleus.<br>Basic concepts of elementary quantum mechanics: wave function and operators.<br>Wave function and mathematical description of a double-slit experiment with electrons. The principle of superposition.<br>Measurement in quantum mechanics.<br>Particle in an infinite well. Physical significance and properties of the wave function.<br>Free particle. Wave packets based on the principle of superposition to describe a free particle.<br>Time-dependent and time-independent Schrodinger equations. Stationary states.<br>Linear and Hermitian operators acting on the space of wave functions.<br>Properties of Hermitian operators. Operators corresponding to simple |                                            |

| <p>physical quantities known from classical physics. Commutator and its significance.<br/> Derivation of the uncertainty principle.<br/> Time evolution of the general wave function and time evolution of the mean values of physical quantities.<br/> Exact derivation of bound state solutions of simple quantum systems and their properties.<br/> The final potential well and its graphical solution.<br/> A simple harmonic oscillator and ladder operators (i) in the representation of wave functions, (ii) in the general Dirac bra / ket formalism, (iii) in the energy representation.<br/> Angular momentum: eigenvalues and eigenfunctions. Properties of spherical harmonics.<br/> Derivation of the exact solution for a hydrogen atom (Coulomb potential) and properties of the wave functions of the ground state and lowest excited states.<br/> Spin.<br/> Stern-Gerlach experiment. Orbital vs. spin angular momentum of the electron.<br/> Spin description formalism: spinors and 2x2 Hermitian matrices corresponding to the spin projection operators on the x, y, z axes and on the axis given by a general unit vector.<br/> Pauli matrices and their properties, their eigenvalues and eigenvectors.<br/> Spin precession in an external homogeneous magnetic field.<br/> Time-independent perturbation theory for non-degenerate states as an example of an approximate method for solving the time-independent Schrodinger equation. Usefulness of the method and convergence criteria. Derivation and properties of the solution in the first-order perturbation theory. Motivation for the second order. Energy levels in the second-order perturbation theory - derivation and examples.</p> |      |       |      |       |       |   |   |   |   |   |    |      |      |       |      |       |       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------|------|-------|-------|---|---|---|---|---|----|------|------|-------|------|-------|-------|
| <p><b>Recommended literature:</b><br/> Úvod do kvantovej mechaniky / Ján Pišút, Ladislav Gomolčák, Vladimír Černý. Bratislava : Alfa, 1983<br/> Zbierka úloh z kvantovej mechaniky / Ján Pišút, Vladimír Černý, Peter Prešnajder. Bratislava : Alfa, 1985 (No English translations exist.)<br/> D.J.Griffiths: Introduction to Quantum Mechanics, 2ed, Pearson Education Inc, 2005</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |       |      |       |       |   |   |   |   |   |    |      |      |       |      |       |       |
| <p><b>Languages necessary to complete the course:</b><br/> Slovak, English</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |       |      |       |       |   |   |   |   |   |    |      |      |       |      |       |       |
| <p><b>Notes:</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |       |      |       |       |   |   |   |   |   |    |      |      |       |      |       |       |
| <p><b>Past grade distribution</b><br/> Total number of evaluated students: 300</p> <table border="1"> <thead> <tr> <th>A</th><th>B</th><th>C</th><th>D</th><th>E</th><th>FX</th></tr> </thead> <tbody> <tr> <td>21,0</td><td>9,67</td><td>11,33</td><td>20,0</td><td>26,67</td><td>11,33</td></tr> </tbody> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |       |      |       |       | A | B | C | D | E | FX | 21,0 | 9,67 | 11,33 | 20,0 | 26,67 | 11,33 |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | B    | C     | D    | E     | FX    |   |   |   |   |   |    |      |      |       |      |       |       |
| 21,0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 9,67 | 11,33 | 20,0 | 26,67 | 11,33 |   |   |   |   |   |    |      |      |       |      |       |       |
| <p><b>Lecturers:</b> doc. RNDr. Tomáš Blažek, PhD.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |       |      |       |       |   |   |   |   |   |    |      |      |       |      |       |       |
| <p><b>Last change:</b> 10.03.2022</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |       |      |       |       |   |   |   |   |   |    |      |      |       |      |       |       |
| <p><b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |       |      |       |       |   |   |   |   |   |    |      |      |       |      |       |       |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                            |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |
| <b>Course ID:</b><br>FMFLKTF/1-FYZ-365/15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Course title:</b><br>Quantum Theory (2) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 / 2 <b>per level/semester:</b> 52 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                            |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                            |
| <b>Recommended semester:</b> 8.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                            |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                            |
| <b>Recommended prerequisites:</b><br>1-FYZ-310 Kvantová teória (1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                            |
| <b>Course requirements:</b><br>Continuous assesment: homework problem sets, exam<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                            |
| <b>Learning outcomes:</b><br>Learning the basic ideas of quantum mechanics and limitations of macroscopic classical physics. Acquiring knowledge of elementary mathematical formalism and problem solving skills. Developing physics thinking required to control quantum systems.                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                            |
| <b>Class syllabus:</b><br>Perturbation theory for degenerate states. Applications: Stark effect and Zeeman effect for hydrogen atom. Variational method. Scattering. Born approximation. Partial waves. Optical theorem. Scattering of identical particles. Charged particle in an electromagnetic field. Gauge symmetry in quantum mechanics. Time-dependent perturbation theory. Harmonic perturbation. Fermi's golden rule. Einstein's relations for spontaneous and stimulated emission. Mathematical formalism of quantum mechanics. Pictures for time evolution of wave functions and operators. Density matrix. Rotation and angular momentum. Irreducible representations of SU (2), or rotation group SO (3). |                                            |
| <b>Recommended literature:</b><br>Úvod do kvantovej mechaniky / Ján Pišút, Ladislav Gomolčák, Vladimír Černý. Bratislava : Alfa, 1983<br>Zbierka úloh z kvantovej mechaniky / Ján Pišút, Vladimír Černý, Peter Prešnajder. Bratislava : Alfa, 1985<br>D.J.Griffiths: Introduction to Quantum Mechanics, 2ed, Pearson Education Inc, 2005                                                                                                                                                                                                                                                                                                                                                                               |                                            |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                            |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                            |

|                                                   |       |       |      |      |       |
|---------------------------------------------------|-------|-------|------|------|-------|
| <b>Past grade distribution</b>                    |       |       |      |      |       |
| Total number of evaluated students: 59            |       |       |      |      |       |
| A                                                 | B     | C     | D    | E    | FX    |
| 54,24                                             | 11,86 | 13,56 | 5,08 | 5,08 | 10,17 |
| <b>Lecturers:</b> doc. RNDr. Tomáš Blažek, PhD.   |       |       |      |      |       |
| <b>Last change:</b> 10.03.2022                    |       |       |      |      |       |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |       |       |      |      |       |

## COURSE DESCRIPTION

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------------------------------|------|------|------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                         |       |                                              |      |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                       |       |                                              |      |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                         |       |                                              |      |      |      |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-161/00                                                                                                                                                                                                                                                                                                              |       | <b>Course title:</b><br>Russian Language (1) |      |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                   |       |                                              |      |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                             |       |                                              |      |      |      |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                         |       |                                              |      |      |      |
| <b>Educational level:</b> I., I.II., II.                                                                                                                                                                                                                                                                                                                |       |                                              |      |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                   |       |                                              |      |      |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                           |       |                                              |      |      |      |
| <b>Learning outcomes:</b><br>Basic communication in Russian, developing other Russian language skills - listening comprehension, reading and writing.                                                                                                                                                                                                   |       |                                              |      |      |      |
| <b>Class syllabus:</b><br>To master the fundamentals of general Russian. The language level is A1.<br>Learning the Cyrillic (Russian) alphabet, gaining basic language competence, building up skills and confidence in dealing with unfamiliar authentic and semi-authentic texts.<br>The subject provides a course in Russian language for beginners. |       |                                              |      |      |      |
| <b>Recommended literature:</b><br>The textbook: : Точка Ру А1 (Ольга Долматова, Екатерина Новачац), pracovné karty Падежи 1 (Л.С. Безкоровайная, В.Е. Штыленко).                                                                                                                                                                                        |       |                                              |      |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                      |       |                                              |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                           |       |                                              |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 746                                                                                                                                                                                                                                                                               |       |                                              |      |      |      |
| A                                                                                                                                                                                                                                                                                                                                                       | B     | C                                            | D    | E    | FX   |
| 57,77                                                                                                                                                                                                                                                                                                                                                   | 16,62 | 11,13                                        | 4,16 | 1,74 | 8,58 |
| <b>Lecturers:</b> Viktoria Mirsalova                                                                                                                                                                                                                                                                                                                    |       |                                              |      |      |      |
| <b>Last change:</b> 20.06.2022                                                                                                                                                                                                                                                                                                                          |       |                                              |      |      |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                                                                                                       |       |                                              |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                        |       |                                              |      |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                      |       |                                              |      |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                        |       |                                              |      |      |      |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-162/00                                                                                                                                                                                                                                                                                                                             |       | <b>Course title:</b><br>Russian Language (2) |      |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                  |       |                                              |      |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                            |       |                                              |      |      |      |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                        |       |                                              |      |      |      |
| <b>Educational level:</b> I., I.II., II.                                                                                                                                                                                                                                                                                                                               |       |                                              |      |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                  |       |                                              |      |      |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                          |       |                                              |      |      |      |
| <b>Learning outcomes:</b><br>Basic communication in Russian, developing other Russian language skills - listening comprehension, reading and writing.                                                                                                                                                                                                                  |       |                                              |      |      |      |
| <b>Class syllabus:</b><br>To master the fundamentals of general Russian.<br>Learning the Cyrillic (Russian) alphabet, gaining basic language competence, building up skills and confidence in dealing with unfamiliar authentic and semi-authentic texts.<br>The subject continues the program of Russian language (1) and provides a course of Russian for beginners. |       |                                              |      |      |      |
| <b>Recommended literature:</b><br>Textbook: Точка Ру А1 (Ольга Долматова, Екатерина Новачац), pracovné karty Падежи 1 (Л.С. Безкорвайная, В.Е. Штыленко).                                                                                                                                                                                                              |       |                                              |      |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                     |       |                                              |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                          |       |                                              |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 435                                                                                                                                                                                                                                                                                              |       |                                              |      |      |      |
| A                                                                                                                                                                                                                                                                                                                                                                      | B     | C                                            | D    | E    | FX   |
| 63,91                                                                                                                                                                                                                                                                                                                                                                  | 16,09 | 8,97                                         | 3,91 | 0,92 | 6,21 |
| <b>Lecturers:</b> Viktoria Mirsalova                                                                                                                                                                                                                                                                                                                                   |       |                                              |      |      |      |
| <b>Last change:</b> 20.06.2022                                                                                                                                                                                                                                                                                                                                         |       |                                              |      |      |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                                                                                                                      |       |                                              |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                              |      |     |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                         |       |                                              |      |     |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                           |       |                                              |      |     |      |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-261/00                                                                                                                                                                                                                                                                                                                                                                                                |       | <b>Course title:</b><br>Russian Language (3) |      |     |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                     |       |                                              |      |     |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                              |      |     |      |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                              |      |     |      |
| <b>Educational level:</b> I., I.II., II.                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                              |      |     |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                              |      |     |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                             |       |                                              |      |     |      |
| <b>Learning outcomes:</b><br>Basic communication in Russian, developing other Russian language skills - listening comprehension, reading and writing.                                                                                                                                                                                                                                                                                     |       |                                              |      |     |      |
| <b>Class syllabus:</b><br>Learning the handwritten Russian (Russian Cursive Cyrillic), developing further language skills, gaining knowledge of Russian culture, history and way of life, pre-intermediate to intermediate grammar and vocabulary.<br>The course "Russian for Intermediate Students" is a follow-up to "Russian for Beginners". The subject of the course is general Russian in the range appropriate to the given level. |       |                                              |      |     |      |
| <b>Recommended literature:</b><br>Точка Ру А2 (Ольга Долматова, Екатерина Новачац) а Short Stories in Russian (Olly Richards, Alex Rowlings)                                                                                                                                                                                                                                                                                              |       |                                              |      |     |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                        |       |                                              |      |     |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                              |      |     |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 215                                                                                                                                                                                                                                                                                                                                                                 |       |                                              |      |     |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                         | B     | C                                            | D    | E   | FX   |
| 68,84                                                                                                                                                                                                                                                                                                                                                                                                                                     | 17,67 | 9,3                                          | 2,33 | 0,0 | 1,86 |
| <b>Lecturers:</b> Viktoria Mirsalova                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                              |      |     |      |
| <b>Last change:</b> 20.06.2022                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                              |      |     |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                                                                                                                                                                                         |       |                                              |      |     |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                              |      |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                         |       |                                              |      |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                           |       |                                              |      |      |      |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-262/00                                                                                                                                                                                                                                                                                                                                                                                                |       | <b>Course title:</b><br>Russian Language (4) |      |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                            |       |                                              |      |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                              |      |      |      |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                              |      |      |      |
| <b>Educational level:</b> I., I.II., II.                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                              |      |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                              |      |      |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                             |       |                                              |      |      |      |
| <b>Learning outcomes:</b><br>Learning the handwritten Russian (Russian Cursive Cyrillic), developing further language skills, gaining knowledge of Russian culture, history and way of life, pre-intermediate to intermediate grammar and vocabulary.                                                                                                                                                                                     |       |                                              |      |      |      |
| <b>Class syllabus:</b><br>Learning the handwritten Russian (Russian Cursive Cyrillic), developing further language skills, gaining knowledge of Russian culture, history and way of life, pre-intermediate to intermediate grammar and vocabulary.<br>The course "Russian for Intermediate Students" is a follow-up to "Russian for Beginners". The subject of the course is general Russian in the range appropriate to the given level. |       |                                              |      |      |      |
| <b>Recommended literature:</b><br>Точка Ру А2 (Ольга Долматова, Екатерина Новачац) a Short Stories in Russian (Olly Richards, Alex Rowlings)                                                                                                                                                                                                                                                                                              |       |                                              |      |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                        |       |                                              |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                              |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 153                                                                                                                                                                                                                                                                                                                                                                 |       |                                              |      |      |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                         | B     | C                                            | D    | E    | FX   |
| 74,51                                                                                                                                                                                                                                                                                                                                                                                                                                     | 14,38 | 7,19                                         | 2,61 | 0,65 | 0,65 |
| <b>Lecturers:</b> Viktoria Mirsalova                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                              |      |      |      |
| <b>Last change:</b> 20.06.2022                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                              |      |      |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                                                                                                                                                                                         |       |                                              |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                   |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                   |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                   |
| <b>Course ID:</b><br>FMFI.KAI/2-IKV a-192/19                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Course title:</b><br>Science, Technology and Humanity: Opportunities and Risks |
| <b>Educational activities:</b><br><b>Type of activities:</b> seminar<br><b>Number of hours:</b><br><b>per week: 3 per level/semester: 39</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                       |                                                                                   |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                   |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                   |
| <b>Educational level:</b> I., I.II., II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                   |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                   |
| <b>Course requirements:</b><br>Semestral evaluation: active participation<br>Final evaluation: essay<br>Weight of the final evaluation: 60%<br>To achieve an A, 90% is needed, for B at least 80%, for C 70%, for D, 60% and for an E, at least 50% of overall assessment.                                                                                                                                                                                                                                        |                                                                                   |
| <b>Learning outcomes:</b><br>The students will gain awareness of the contemporary and potential future challenges posed by scientific and technological innovations and their impact on human behaviour, culture and society.                                                                                                                                                                                                                                                                                     |                                                                                   |
| <b>Class syllabus:</b><br>Big data: privacy, politics and power,<br>Internet of things, its usefulness and threats,<br>Assistant AI and its place in future society,<br>Job market and inequality,<br>Enhancements and human rights and the right to change self and others,<br>Initiatives for responsible research,<br>Artificial minds,<br>Hybridization between species and between AI and organic minds,<br>Future of minds and trans-humanism,<br>Artificial emotional intelligence,<br>An after human era. |                                                                                   |
| <b>Recommended literature:</b><br>- S. Russell: Human compatible. Artificial intelligence and the problem of control. Viking, 2019.<br>- J. Havens: Heartificial intelligence. Embracing our humanity to maximize machines. Penguin, 2016.<br>- P. Boddington: Towards a code of ethics for artificial intelligence. Springer, 2017.<br>- M. Shanahan: The technological singularity. MIT Press, 2015.                                                                                                            |                                                                                   |

- C. MacKellar, C.: Cyborg Mind: What Brain–Computer and Mind–Cyberspace Interfaces Mean for Cyberneuroethics. Berghahn Books, 2019.
- G. Bel, J. Gemmell: Total Recall, How the e-Memory Revolution will change everything. Dutton, 2009.
- S. Zuboff: The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power. PublicAffairs, 2019.
- C. O'Neil: Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy. Crown Publishers, 2016.
- M. Tegmark: Life 3.0. Allen Lane, 2017.

**Languages necessary to complete the course:**

English

**Notes:**

**Past grade distribution**

Total number of evaluated students: 146

| A     | B     | C     | D    | E    | FX   |
|-------|-------|-------|------|------|------|
| 40,41 | 21,92 | 16,44 | 6,85 | 4,79 | 9,59 |

**Lecturers:** doc. RNDr. Martin Takáč, PhD., PhDr. Ing. Tomáš Gál, PhD.

**Last change:** 28.02.2020

**Approved by:** doc. RNDr. Tomáš Blažek, PhD.

## COURSE DESCRIPTION

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------------------------------------------------------------|-------|-----|------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                              |       |                                                                 |       |     |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                            |       |                                                                 |       |     |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                              |       |                                                                 |       |     |      |
| <b>Course ID:</b><br>FMFL.KTF/2-FTF-136/17                                                                                                                                                                                                                                                                                   |       | <b>Course title:</b><br>Selected Topics in Theory of Relativity |       |     |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                           |       |                                                                 |       |     |      |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                  |       |                                                                 |       |     |      |
| <b>Recommended semester:</b> 7.                                                                                                                                                                                                                                                                                              |       |                                                                 |       |     |      |
| <b>Educational level:</b> I., II.                                                                                                                                                                                                                                                                                            |       |                                                                 |       |     |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                        |       |                                                                 |       |     |      |
| <b>Course requirements:</b><br>During the semester, students receive homework that is not evaluated, but at the beginning of each lecture there will be a short paper with a similar assignment. To complete the course, it is necessary to obtain at least 50% of points.<br>Scale of assessment (preliminary/final): 100/0 |       |                                                                 |       |     |      |
| <b>Learning outcomes:</b><br>After completing the course, the student should understand in detail the basic concepts of the special theory of relativity.                                                                                                                                                                    |       |                                                                 |       |     |      |
| <b>Class syllabus:</b><br>experiments leading to special theories of relativity, coordinate systems, relativity in classical mechanics, Minkowski space-time and space-time intervals, space-time diagrams, four-vectors and Lorentz transformations, theory of relativity and electromagnetism;                             |       |                                                                 |       |     |      |
| <b>Recommended literature:</b><br>Special Relativity (Springer Undergraduate Mathematics Series) / Nicholas.M.J.Woodhouse, Springer-Verlag Berlin Heidelberg 1992;<br>Dynamics and relativity (University of Cambridge Part IA Mathematical Tripos), David Tong 2013;                                                        |       |                                                                 |       |     |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                        |       |                                                                 |       |     |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                |       |                                                                 |       |     |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 67                                                                                                                                                                                                                                                     |       |                                                                 |       |     |      |
| A                                                                                                                                                                                                                                                                                                                            | B     | C                                                               | D     | E   | FX   |
| 47,76                                                                                                                                                                                                                                                                                                                        | 17,91 | 14,93                                                           | 16,42 | 0,0 | 2,99 |
| <b>Lecturers:</b> Mgr. Peter Maták, PhD.                                                                                                                                                                                                                                                                                     |       |                                                                 |       |     |      |

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|---------------------------------------------------|
| <b>Last change:</b> 18.05.2022                    |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                              |     |                                                  |     |     |       |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                            |     |                                                  |     |     |       |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                              |     |                                                  |     |     |       |
| <b>Course ID:</b><br>FMFI.KAFZM/1-FYZ-121/22                                                                                                                                                                                                                                                                                                 |     | <b>Course title:</b><br>Seminar from Physics (1) |     |     |       |
| <b>Educational activities:</b><br><b>Type of activities:</b> seminar<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                  |     |                                                  |     |     |       |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                  |     |                                                  |     |     |       |
| <b>Recommended semester:</b> 5.                                                                                                                                                                                                                                                                                                              |     |                                                  |     |     |       |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                 |     |                                                  |     |     |       |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                        |     |                                                  |     |     |       |
| <b>Course requirements:</b><br>Interim evaluation: presentation<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): Weight of the intermediate / final evaluation: 100/0                                                                                                           |     |                                                  |     |     |       |
| <b>Learning outcomes:</b><br>The student will learn to study independently and then reference a selected topic from contemporary physics.                                                                                                                                                                                                    |     |                                                  |     |     |       |
| <b>Class syllabus:</b><br>Each student chooses one topic and in cooperation with the client of the topic prepares a short work in the range of several pages and at the same time presents the studied topic in the range of 20 minutes. Topics will be proposed by employees and doctoral students of physics departments, or from the SAS. |     |                                                  |     |     |       |
| <b>Recommended literature:</b><br>articles according to the specification of the submitter of the topic                                                                                                                                                                                                                                      |     |                                                  |     |     |       |
| <b>Languages necessary to complete the course:</b><br>Slovak / English (study literature in Slovak or English)                                                                                                                                                                                                                               |     |                                                  |     |     |       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                |     |                                                  |     |     |       |
| <b>Past grade distribution</b><br>Total number of evaluated students: 42                                                                                                                                                                                                                                                                     |     |                                                  |     |     |       |
| A                                                                                                                                                                                                                                                                                                                                            | B   | C                                                | D   | E   | FX    |
| 85,71                                                                                                                                                                                                                                                                                                                                        | 0,0 | 0,0                                              | 0,0 | 0,0 | 14,29 |
| <b>Lecturers:</b> doc. Mgr. Jozef Kristek, DrSc.                                                                                                                                                                                                                                                                                             |     |                                                  |     |     |       |
| <b>Last change:</b> 24.02.2022                                                                                                                                                                                                                                                                                                               |     |                                                  |     |     |       |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                                                                                            |     |                                                  |     |     |       |

## COURSE DESCRIPTION

|                                                                                                                                                                                                                                                                                                                                                                                              |     |                                                  |     |     |      |
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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                              |     |                                                  |     |     |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                            |     |                                                  |     |     |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                              |     |                                                  |     |     |      |
| <b>Course ID:</b><br>FMFI.KAFZM/1-FYZ-220/22                                                                                                                                                                                                                                                                                                                                                 |     | <b>Course title:</b><br>Seminar from Physics (2) |     |     |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> seminar<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                           |     |                                                  |     |     |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                  |     |                                                  |     |     |      |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                                                                                                                                                                              |     |                                                  |     |     |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                 |     |                                                  |     |     |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                        |     |                                                  |     |     |      |
| <b>Course requirements:</b><br>Interim evaluation: presentation<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): Weight of the intermediate / final evaluation: 100/0                                                                                                                                                           |     |                                                  |     |     |      |
| <b>Learning outcomes:</b><br>The student will learn to study independently and then reference a selected topic from contemporary physics.                                                                                                                                                                                                                                                    |     |                                                  |     |     |      |
| <b>Class syllabus:</b><br>Each student chooses one topic and in cooperation with the client of the topic prepares a short work in the range of several pages and at the same time presents the studied topic in the range of 20 minutes.<br>The work and presentation are in English.<br>Topics will be proposed by employees and doctoral students of physics departments, or from the SAS. |     |                                                  |     |     |      |
| <b>Recommended literature:</b><br>articles according to the specification of the submitter of the topic                                                                                                                                                                                                                                                                                      |     |                                                  |     |     |      |
| <b>Languages necessary to complete the course:</b><br>Slovak / English (study literature in Slovak or English)                                                                                                                                                                                                                                                                               |     |                                                  |     |     |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                |     |                                                  |     |     |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 20                                                                                                                                                                                                                                                                                                                     |     |                                                  |     |     |      |
| A                                                                                                                                                                                                                                                                                                                                                                                            | B   | C                                                | D   | E   | FX   |
| 85,0                                                                                                                                                                                                                                                                                                                                                                                         | 5,0 | 0,0                                              | 0,0 | 0,0 | 10,0 |
| <b>Lecturers:</b> doc. Mgr. Jozef Kristek, DrSc.                                                                                                                                                                                                                                                                                                                                             |     |                                                  |     |     |      |
| <b>Last change:</b> 22.02.2022                                                                                                                                                                                                                                                                                                                                                               |     |                                                  |     |     |      |

**Approved by:** doc. RNDr. Tomáš Blažek, PhD.

## COURSE DESCRIPTION

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------------------------------|------|-----|------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                    |       |                                              |      |     |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                  |       |                                              |      |     |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                    |       |                                              |      |     |      |
| <b>Course ID:</b><br>FMFI.KMANM/1-MAT-715/15                                                                                                                                                       |       | <b>Course title:</b><br>Seminar in MS-Office |      |     |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> seminar<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning |       |                                              |      |     |      |
| <b>Number of credits:</b> 2                                                                                                                                                                        |       |                                              |      |     |      |
| <b>Recommended semester:</b> 2.                                                                                                                                                                    |       |                                              |      |     |      |
| <b>Educational level:</b> I.                                                                                                                                                                       |       |                                              |      |     |      |
| <b>Prerequisites:</b>                                                                                                                                                                              |       |                                              |      |     |      |
| <b>Antirequisites:</b> FMFI.KMANM/1-MAT-715/00                                                                                                                                                     |       |                                              |      |     |      |
| <b>Course requirements:</b>                                                                                                                                                                        |       |                                              |      |     |      |
| <b>Learning outcomes:</b>                                                                                                                                                                          |       |                                              |      |     |      |
| <b>Class syllabus:</b>                                                                                                                                                                             |       |                                              |      |     |      |
| <b>Recommended literature:</b>                                                                                                                                                                     |       |                                              |      |     |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                 |       |                                              |      |     |      |
| <b>Notes:</b>                                                                                                                                                                                      |       |                                              |      |     |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 143                                                                                                                          |       |                                              |      |     |      |
| A                                                                                                                                                                                                  | B     | C                                            | D    | E   | FX   |
| 57,34                                                                                                                                                                                              | 15,38 | 6,99                                         | 6,99 | 4,9 | 8,39 |
| <b>Lecturers:</b> RNDr. Peter Švaňa, CSc.                                                                                                                                                          |       |                                              |      |     |      |
| <b>Last change:</b> 02.06.2015                                                                                                                                                                     |       |                                              |      |     |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                  |       |                                              |      |     |      |

## COURSE DESCRIPTION

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------------------------|------|------|------|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                        |      |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                        |      |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                     |       |                                        |      |      |      |
| <b>Course ID:</b><br>FMFI.KMANM/1-MAT-770/15                                                                                                                                                                                                                                                                                                                                                                                                        |       | <b>Course title:</b><br>Seminar in TEX |      |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> seminar<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                  |       |                                        |      |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                        |      |      |      |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                        |      |      |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                        |      |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                        |      |      |      |
| <b>Course requirements:</b><br>Ongoing assessment: 10 individual tasks 5 points each<br>Exam: individual work, rewriting the specified text for 50 points<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 50/50                                                                                                                                                                       |       |                                        |      |      |      |
| <b>Learning outcomes:</b><br>Mastering the MikTeX or LaTeX compiler for writing professional texts. Introduction to editors for creating such texts.                                                                                                                                                                                                                                                                                                |       |                                        |      |      |      |
| <b>Class syllabus:</b><br>1. Visualization of a tex file, error messages<br>2. Basic structure of a tex file, commands and environments, organization of different types of documents<br>3. Styles and font sizes, tables writing, footnotes<br>4. Mathematical formulas, creating simple pictures and inserting external pictures<br>5. Literature writing, index creation, slides<br>6. Creation of special documents (presentation, letter, ...) |       |                                        |      |      |      |
| <b>Recommended literature:</b><br>Teacher's own electronic texts published through web documents.                                                                                                                                                                                                                                                                                                                                                   |       |                                        |      |      |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                               |       |                                        |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                        |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 89                                                                                                                                                                                                                                                                                                                                                                            |       |                                        |      |      |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                   | B     | C                                      | D    | E    | FX   |
| 66,29                                                                                                                                                                                                                                                                                                                                                                                                                                               | 14,61 | 7,87                                   | 2,25 | 4,49 | 4,49 |

|                                                   |
|---------------------------------------------------|
| <b>Lecturers:</b> RNDr. Michal Pospíšil, PhD.     |
| <b>Last change:</b> 17.06.2022                    |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                |       |     |                                                                  |      |      |       |       |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                              |       |     |                                                                  |      |      |       |       |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                |       |     |                                                                  |      |      |       |       |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-171/20                                                                                                                                                                                                                                                                                                                                                                     |       |     | <b>Course title:</b><br>Slovak Language for Foreign Students (1) |      |      |       |       |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                          |       |     |                                                                  |      |      |       |       |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                    |       |     |                                                                  |      |      |       |       |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                |       |     |                                                                  |      |      |       |       |
| <b>Educational level:</b> I., I.II., II., III.                                                                                                                                                                                                                                                                                                                                                                 |       |     |                                                                  |      |      |       |       |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                          |       |     |                                                                  |      |      |       |       |
| <b>Course requirements:</b><br>tests<br>Course prerequisites:<br><a href="https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebežneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/">https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebežneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/</a><br>Scale of assessment (preliminary/final): 100/0 |       |     |                                                                  |      |      |       |       |
| <b>Learning outcomes:</b><br>This course is aimed for foreign students to learn the fundamentals of the Slovak language with the focus on basic communication as well as all other language skills- listening comprehension,reading and writing.                                                                                                                                                               |       |     |                                                                  |      |      |       |       |
| <b>Class syllabus:</b><br>The syllabus is targeted at the comprehension of the basics of the Slovak language for the absolute beginners (A1).                                                                                                                                                                                                                                                                  |       |     |                                                                  |      |      |       |       |
| <b>Recommended literature:</b><br>Križom- Krážom Slovenčina 1, additional material to further support the covered topics.                                                                                                                                                                                                                                                                                      |       |     |                                                                  |      |      |       |       |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                             |       |     |                                                                  |      |      |       |       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                  |       |     |                                                                  |      |      |       |       |
| <b>Past grade distribution</b><br>Total number of evaluated students: 155                                                                                                                                                                                                                                                                                                                                      |       |     |                                                                  |      |      |       |       |
| A                                                                                                                                                                                                                                                                                                                                                                                                              | ABS   | B   | C                                                                | D    | E    | FX    | NEABS |
| 40,65                                                                                                                                                                                                                                                                                                                                                                                                          | 21,29 | 7,1 | 4,52                                                             | 0,65 | 1,29 | 21,29 | 3,23  |
| <b>Lecturers:</b> Mgr. Aneta Barnes                                                                                                                                                                                                                                                                                                                                                                            |       |     |                                                                  |      |      |       |       |
| <b>Last change:</b> 21.06.2022                                                                                                                                                                                                                                                                                                                                                                                 |       |     |                                                                  |      |      |       |       |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                                                                                                                                                              |       |     |                                                                  |      |      |       |       |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                |       |      |                                                                  |     |     |     |       |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                              |       |      |                                                                  |     |     |     |       |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                |       |      |                                                                  |     |     |     |       |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-172/20                                                                                                                                                                                                                                                                                                                                                                     |       |      | <b>Course title:</b><br>Slovak Language for Foreign Students (2) |     |     |     |       |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                          |       |      |                                                                  |     |     |     |       |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                    |       |      |                                                                  |     |     |     |       |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                |       |      |                                                                  |     |     |     |       |
| <b>Educational level:</b> I., I.II., II., III.                                                                                                                                                                                                                                                                                                                                                                 |       |      |                                                                  |     |     |     |       |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                          |       |      |                                                                  |     |     |     |       |
| <b>Course requirements:</b><br>tests<br>Course prerequisites:<br><a href="https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebežneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/">https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebežneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/</a><br>Scale of assessment (preliminary/final): 100/0 |       |      |                                                                  |     |     |     |       |
| <b>Learning outcomes:</b><br>This course is aimed for foreign students to learn the fundamentals of the Slovak language with the focus on basic communication as well as all other language skills- listening comprehension,reading and writing.                                                                                                                                                               |       |      |                                                                  |     |     |     |       |
| <b>Class syllabus:</b><br>The syllabus is targeted at the comprehension of the basics of the Slovak language for the absolute beginners (A1) and this course is a follow up course to the Slovak language course 1.                                                                                                                                                                                            |       |      |                                                                  |     |     |     |       |
| <b>Recommended literature:</b><br>Križom- Krážom Slovenčina 1, additional material to further support the covered topics                                                                                                                                                                                                                                                                                       |       |      |                                                                  |     |     |     |       |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                             |       |      |                                                                  |     |     |     |       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                  |       |      |                                                                  |     |     |     |       |
| <b>Past grade distribution</b><br>Total number of evaluated students: 87                                                                                                                                                                                                                                                                                                                                       |       |      |                                                                  |     |     |     |       |
| A                                                                                                                                                                                                                                                                                                                                                                                                              | ABS   | B    | C                                                                | D   | E   | FX  | NEABS |
| 63,22                                                                                                                                                                                                                                                                                                                                                                                                          | 18,39 | 1,15 | 1,15                                                             | 0,0 | 0,0 | 9,2 | 6,9   |
| <b>Lecturers:</b> Mgr. Aneta Barnes                                                                                                                                                                                                                                                                                                                                                                            |       |      |                                                                  |     |     |     |       |
| <b>Last change:</b> 21.06.2022                                                                                                                                                                                                                                                                                                                                                                                 |       |      |                                                                  |     |     |     |       |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                                                                                                                                                              |       |      |                                                                  |     |     |     |       |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                |      |       |                                                                  |      |     |      |       |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                              |      |       |                                                                  |      |     |      |       |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                |      |       |                                                                  |      |     |      |       |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-271/20                                                                                                                                                                                                                                                                                                                                                                     |      |       | <b>Course title:</b><br>Slovak Language for Foreign Students (3) |      |     |      |       |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                 |      |       |                                                                  |      |     |      |       |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                    |      |       |                                                                  |      |     |      |       |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                                                                                                |      |       |                                                                  |      |     |      |       |
| <b>Educational level:</b> I., I.II., II., III.                                                                                                                                                                                                                                                                                                                                                                 |      |       |                                                                  |      |     |      |       |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                          |      |       |                                                                  |      |     |      |       |
| <b>Course requirements:</b><br>tests<br>Course prerequisites:<br><a href="https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebežneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/">https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebežneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/</a><br>Scale of assessment (preliminary/final): 100/0 |      |       |                                                                  |      |     |      |       |
| <b>Learning outcomes:</b><br>This course is aimed for foreign students to better comprehend all the language skills important to enable correct usage of the Slovak language – listening comprehension, reading, writing and speaking.                                                                                                                                                                         |      |       |                                                                  |      |     |      |       |
| <b>Class syllabus:</b><br>The syllabus is targeted at the comprehension of all the language skills of the Slovak language , and it is a follow up course to the Slovak language course 2.                                                                                                                                                                                                                      |      |       |                                                                  |      |     |      |       |
| <b>Recommended literature:</b><br>Križom-Krážom Slovenčina 2, additional material to further support the covered topics.                                                                                                                                                                                                                                                                                       |      |       |                                                                  |      |     |      |       |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                             |      |       |                                                                  |      |     |      |       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                  |      |       |                                                                  |      |     |      |       |
| <b>Past grade distribution</b><br>Total number of evaluated students: 32                                                                                                                                                                                                                                                                                                                                       |      |       |                                                                  |      |     |      |       |
| A                                                                                                                                                                                                                                                                                                                                                                                                              | ABS  | B     | C                                                                | D    | E   | FX   | NEABS |
| 59,38                                                                                                                                                                                                                                                                                                                                                                                                          | 3,13 | 18,75 | 3,13                                                             | 3,13 | 0,0 | 12,5 | 0,0   |
| <b>Lecturers:</b> Mgr. Aneta Barnes                                                                                                                                                                                                                                                                                                                                                                            |      |       |                                                                  |      |     |      |       |
| <b>Last change:</b> 21.06.2022                                                                                                                                                                                                                                                                                                                                                                                 |      |       |                                                                  |      |     |      |       |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                                                                                                                                                              |      |       |                                                                  |      |     |      |       |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                |     |     |                                                                  |     |     |     |       |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                              |     |     |                                                                  |     |     |     |       |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                |     |     |                                                                  |     |     |     |       |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-272/20                                                                                                                                                                                                                                                                                                                                                                     |     |     | <b>Course title:</b><br>Slovak Language for Foreign Students (4) |     |     |     |       |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                 |     |     |                                                                  |     |     |     |       |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                    |     |     |                                                                  |     |     |     |       |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                |     |     |                                                                  |     |     |     |       |
| <b>Educational level:</b> I., I.II., II., III.                                                                                                                                                                                                                                                                                                                                                                 |     |     |                                                                  |     |     |     |       |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                          |     |     |                                                                  |     |     |     |       |
| <b>Course requirements:</b><br>tests<br>Course prerequisites:<br><a href="https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebežneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/">https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebežneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/</a><br>Scale of assessment (preliminary/final): 100/0 |     |     |                                                                  |     |     |     |       |
| <b>Learning outcomes:</b><br>This course is aimed for foreign students to better comprehend all the language skills important to enable correct usage of the Slovak language – listening comprehension, reading, writing and speaking.                                                                                                                                                                         |     |     |                                                                  |     |     |     |       |
| <b>Class syllabus:</b><br>The syllabus is targeted at the comprehension of all the language skills of the Slovak language , and it is a follow up course to the Slovak language course 3.                                                                                                                                                                                                                      |     |     |                                                                  |     |     |     |       |
| <b>Recommended literature:</b><br>Križom-Krážom Slovenčina 2, additional material to further support the covered topics.                                                                                                                                                                                                                                                                                       |     |     |                                                                  |     |     |     |       |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                             |     |     |                                                                  |     |     |     |       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                  |     |     |                                                                  |     |     |     |       |
| <b>Past grade distribution</b><br>Total number of evaluated students: 25                                                                                                                                                                                                                                                                                                                                       |     |     |                                                                  |     |     |     |       |
| A                                                                                                                                                                                                                                                                                                                                                                                                              | ABS | B   | C                                                                | D   | E   | FX  | NEABS |
| 84,0                                                                                                                                                                                                                                                                                                                                                                                                           | 0,0 | 4,0 | 4,0                                                              | 0,0 | 0,0 | 8,0 | 0,0   |
| <b>Lecturers:</b> Mgr. Aneta Barnes                                                                                                                                                                                                                                                                                                                                                                            |     |     |                                                                  |     |     |     |       |
| <b>Last change:</b> 21.06.2022                                                                                                                                                                                                                                                                                                                                                                                 |     |     |                                                                  |     |     |     |       |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                                                                                                                                                              |     |     |                                                                  |     |     |     |       |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                              |                                         |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                            |                                         |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                              |                                         |
| <b>Course ID:</b><br>FMFI.KMANM/1-<br>MAT-733/19                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Course title:</b><br>Software MATLAB |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                        |                                         |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                         |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                              |                                         |
| <b>Educational level:</b> I., I.II., II.                                                                                                                                                                                                                                                                                                                                                                                                                     |                                         |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                         |
| <b>Antirequisites:</b> FMFI.KMANM/1-MAT-731/00 and FMFI.KMANM/1-MAT-732/00                                                                                                                                                                                                                                                                                                                                                                                   |                                         |
| <b>Course requirements:</b><br>Continuous assessment: activity<br>Examination: group project, practical computer exam<br>Scale of assessment (preliminary/final): 20/80                                                                                                                                                                                                                                                                                      |                                         |
| <b>Learning outcomes:</b><br>Students will learn the basics of using MATLAB software. They will be able to use MATLAB to calculate some mathematical problems, read files or write to files, plot computed data, create complex functions for reuse and create a graphical user interface GUI for their programs.                                                                                                                                            |                                         |
| <b>Class syllabus:</b><br>Format and conversion of variables, vectors and matrices<br>Programming environment, so-called M-file<br>Reading from a file and plotting data<br>Creating functions<br>Graphical GUI environment                                                                                                                                                                                                                                  |                                         |
| <b>Recommended literature:</b><br>MATLAB - SIMULINK I / Stefan Kozak, Slavomir Kajan. Bratislava: Slovak University of Technology, 1999 Matlab / Jela Babušíková. Bratislava: FMFI UK Library and Publishing Center, 2007<br>Kozák Š., Kajan S., Matlab - Simulink, 1. Slovak University of Technology in Bratislava, 1999. ISBN Dušek F., MatLab and Simulink, University of Pardubice, 2000<br><a href="https://mathworks.com/help">mathworks.com/help</a> |                                         |
| <b>Languages necessary to complete the course:</b><br>slovak                                                                                                                                                                                                                                                                                                                                                                                                 |                                         |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                         |

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| <b>Past grade distribution</b>                    |      |       |       |       |      |
| Total number of evaluated students: 150           |      |       |       |       |      |
| A                                                 | B    | C     | D     | E     | FX   |
| 22,67                                             | 14,0 | 13,33 | 12,67 | 19,33 | 18,0 |
| <b>Lecturers:</b> RNDr. Patrik Mihala, PhD.       |      |       |       |       |      |
| <b>Last change:</b> 15.03.2022                    |      |       |       |       |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |      |       |       |       |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                               |      |                                              |     |     |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                             |      |                                              |     |     |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                               |      |                                              |     |     |      |
| <b>Course ID:</b><br>FMFL.KTV/1-MXX-115/15                                                                                                                                                                                                                                                                                                                                                                                    |      | <b>Course title:</b><br>Sports in Nature (1) |     |     |      |
| <b>Educational activities:</b><br><b>Type of activities:</b><br><b>Number of hours:</b><br><b>per week:</b> <b>per level/semester:</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                         |      |                                              |     |     |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                   |      |                                              |     |     |      |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                               |      |                                              |     |     |      |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                                                                                                                                                                                                           |      |                                              |     |     |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                         |      |                                              |     |     |      |
| <b>Course requirements:</b><br>Grades: A 90%, B 80%, C 70%, D 60%, E 50%.<br>The condition for the award of 1 or 2 credits is the completion of a multi-day course in its full scope, or the completion of one-day courses in the scope of 4 days. Candidates can apply to the leaders of individual courses. From the presented offer of courses, you can choose the one that suits your interests, abilities and deadlines. |      |                                              |     |     |      |
| <b>Learning outcomes:</b><br>Acquisition and development of basic motor skills and abilities in selected sports: skiing and snowboarding. Mastering the correct technique of performing individual movements, which are necessary for skiing and snowboarding.                                                                                                                                                                |      |                                              |     |     |      |
| <b>Class syllabus:</b><br>The student can sign up for the outdoor sports courses offered by the department: skiing, snowboarding and other hobby sports. The lessons in the courses are focused on the development of basic and special movement skills and, mastering the techniques needed for the sports.                                                                                                                  |      |                                              |     |     |      |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                                                                                                                                                |      |                                              |     |     |      |
| <b>Languages necessary to complete the course:</b><br>Slovak                                                                                                                                                                                                                                                                                                                                                                  |      |                                              |     |     |      |
| <b>Notes:</b><br>KTVŠ does not rent ski equipment.                                                                                                                                                                                                                                                                                                                                                                            |      |                                              |     |     |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 310                                                                                                                                                                                                                                                                                                                                                     |      |                                              |     |     |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                             | B    | C                                            | D   | E   | FX   |
| 99,03                                                                                                                                                                                                                                                                                                                                                                                                                         | 0,32 | 0,32                                         | 0,0 | 0,0 | 0,32 |
| <b>Lecturers:</b> Mgr. Martin Dovičák, PhD., Mgr. Tomáš Kuchár, PhD., Mgr. Jana Leginusová, PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, PaedDr. Mikuláš Ortutay, Mgr. Júlia Raábová, PhD., Mgr. Tomáš Lovecký                                                                                                                                                                                                                |      |                                              |     |     |      |

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| <b>Last change:</b> 16.06.2022                    |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                              |     |                                              |     |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                            |     |                                              |     |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                              |     |                                              |     |      |      |
| <b>Course ID:</b><br>FMFL.KTV/1-MXX-215/15                                                                                                                                                                                                                                                                                                                                                                                   |     | <b>Course title:</b><br>Sports in Nature (2) |     |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b><br><b>Number of hours:</b><br><b>per week:</b> <b>per level/semester:</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                        |     |                                              |     |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                  |     |                                              |     |      |      |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                              |     |                                              |     |      |      |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                                                                                                                                                                                                          |     |                                              |     |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                        |     |                                              |     |      |      |
| <b>Course requirements:</b><br>Grades: A 90%, B 80%, C 70%, D 60%, E 50%<br>The condition for the award of 1 or 2 credits is the completion of a multi-day course in its full scope, or the completion of one-day courses in the scope of 4 days. Candidates can apply to the leaders of individual courses. From the presented offer of courses, you can choose the one that suits your interests, abilities and deadlines. |     |                                              |     |      |      |
| <b>Learning outcomes:</b><br>Creating a positive and lasting relationship with physical activity. Acquisition and mastery of basic motor skills and abilities in outdoor sports: windsurfing, beach volleyball, water tourism - river rafting, hiking and other sports according to interest. Training and improving the technique needed for the sports.                                                                    |     |                                              |     |      |      |
| <b>Class syllabus:</b><br>The student can sign up for the outdoor sports courses offered by the department: water tourism - river rafting, windsurfing, beach volleyball, hiking and other hobby sports. The lessons in the courses are focused on the development of basic and special movement skills and, mastering the techniques needed for the sports.                                                                 |     |                                              |     |      |      |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                                                                                                                                               |     |                                              |     |      |      |
| <b>Languages necessary to complete the course:</b><br>Slovak                                                                                                                                                                                                                                                                                                                                                                 |     |                                              |     |      |      |
| <b>Notes:</b><br>KTVŠ will provide sports equipment.                                                                                                                                                                                                                                                                                                                                                                         |     |                                              |     |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 298                                                                                                                                                                                                                                                                                                                                                    |     |                                              |     |      |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                            | B   | C                                            | D   | E    | FX   |
| 92,62                                                                                                                                                                                                                                                                                                                                                                                                                        | 0,0 | 0,0                                          | 0,0 | 0,34 | 7,05 |

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| <b>Lecturers:</b> Mgr. Martin Dovičák, PhD., Mgr. Tomáš Kuchár, PhD., Mgr. Jana Leginusová, PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, PaedDr. Mikuláš Ortutay, Mgr. Júlia Raábová, PhD., Mgr. Tomáš Lovecký |
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| <b>Last change:</b> 16.06.2022 |
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| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |
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## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                              |     |                                              |     |     |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                            |     |                                              |     |     |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                              |     |                                              |     |     |      |
| <b>Course ID:</b><br>FMFI.KTV/1-MXX-216/18                                                                                                                                                                                                                                                                                                                                                                                   |     | <b>Course title:</b><br>Sports in Nature (3) |     |     |      |
| <b>Educational activities:</b><br><b>Type of activities:</b><br><b>Number of hours:</b><br><b>per week: per level/semester:</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                               |     |                                              |     |     |      |
| <b>Number of credits:</b> 1                                                                                                                                                                                                                                                                                                                                                                                                  |     |                                              |     |     |      |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                                                                                                              |     |                                              |     |     |      |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                                                                                                                                                                                                          |     |                                              |     |     |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                        |     |                                              |     |     |      |
| <b>Antirequisites:</b> FMFI.KTV/1-UXX-151/22                                                                                                                                                                                                                                                                                                                                                                                 |     |                                              |     |     |      |
| <b>Course requirements:</b><br>Grades: A 90%, B 80%, C 70%, D 60%, E 50%<br>The condition for the award of 1 or 2 credits is the completion of a multi-day course in its full scope, or the completion of one-day courses in the scope of 4 days. Candidates can apply to the leaders of individual courses. From the presented offer of courses, you can choose the one that suits your interests, abilities and deadlines. |     |                                              |     |     |      |
| <b>Learning outcomes:</b><br>Acquisition and development of basic motor skills and abilities in selected sports: skiing and snowboarding. Mastering the correct technique of performing individual movements, which are necessary for skiing and snowboarding.                                                                                                                                                               |     |                                              |     |     |      |
| <b>Class syllabus:</b><br>The student can sign up for the outdoor sports courses offered by the department: skiing, snowboarding. The lessons in the courses are focused on the development of basic and special movement skills and, mastering the techniques needed for the sports.                                                                                                                                        |     |                                              |     |     |      |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                                                                                                                                               |     |                                              |     |     |      |
| <b>Languages necessary to complete the course:</b><br>Slovak                                                                                                                                                                                                                                                                                                                                                                 |     |                                              |     |     |      |
| <b>Notes:</b><br>KTVŠ does not rent ski equipment.                                                                                                                                                                                                                                                                                                                                                                           |     |                                              |     |     |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 58                                                                                                                                                                                                                                                                                                                                                     |     |                                              |     |     |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                            | B   | C                                            | D   | E   | FX   |
| 98,28                                                                                                                                                                                                                                                                                                                                                                                                                        | 0,0 | 0,0                                          | 0,0 | 0,0 | 1,72 |

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| <b>Lecturers:</b> Mgr. Martin Dovičák, PhD., Mgr. Tomáš Kuchár, PhD., Mgr. Jana Leginusová, PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, PaedDr. Mikuláš Ortutay, Mgr. Júlia Raábová, PhD., Mgr. Tomáš Lovecký |
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| <b>Last change:</b> 16.06.2022 |
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| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |
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## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                              |     |                                              |     |     |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                            |     |                                              |     |     |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                              |     |                                              |     |     |      |
| <b>Course ID:</b><br>FMFI.KTV/1-MXX-217/18                                                                                                                                                                                                                                                                                                                                                                                   |     | <b>Course title:</b><br>Sports in Nature (4) |     |     |      |
| <b>Educational activities:</b><br><b>Type of activities:</b><br><b>Number of hours:</b><br><b>per week: per level/semester:</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                               |     |                                              |     |     |      |
| <b>Number of credits:</b> 1                                                                                                                                                                                                                                                                                                                                                                                                  |     |                                              |     |     |      |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                              |     |                                              |     |     |      |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                                                                                                                                                                                                          |     |                                              |     |     |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                        |     |                                              |     |     |      |
| <b>Antirequisites:</b> FMFI.KTV/1-UXX-152/22                                                                                                                                                                                                                                                                                                                                                                                 |     |                                              |     |     |      |
| <b>Course requirements:</b><br>Grades: A 90%, B 80%, C 70%, D 60%, E 50%<br>The condition for the award of 1 or 2 credits is the completion of a multi-day course in its full scope, or the completion of one-day courses in the scope of 4 days. Candidates can apply to the leaders of individual courses. From the presented offer of courses, you can choose the one that suits your interests, abilities and deadlines. |     |                                              |     |     |      |
| <b>Learning outcomes:</b><br>Creating a positive and lasting relationship with physical activity. Acquisition and mastery of basic motor skills and abilities in outdoor sports: windsurfing, beach volleyball, water tourism - river rafting, hiking and other sports according to interest. Training and improving the technique needed for the sports.                                                                    |     |                                              |     |     |      |
| <b>Class syllabus:</b><br>The student can sign up for the outdoor sports courses offered by the department: water tourism - river rafting, windsurfing, beach volleyball, hiking and other hobby sports. The lessons in the courses are focused on the development of basic and special movement skills and, mastering the techniques needed for the sports.                                                                 |     |                                              |     |     |      |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                                                                                                                                               |     |                                              |     |     |      |
| <b>Languages necessary to complete the course:</b><br>Slovak                                                                                                                                                                                                                                                                                                                                                                 |     |                                              |     |     |      |
| <b>Notes:</b><br>KTVŠ will provide material equipment.                                                                                                                                                                                                                                                                                                                                                                       |     |                                              |     |     |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 41                                                                                                                                                                                                                                                                                                                                                     |     |                                              |     |     |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                            | B   | C                                            | D   | E   | FX   |
| 90,24                                                                                                                                                                                                                                                                                                                                                                                                                        | 0,0 | 0,0                                          | 0,0 | 0,0 | 9,76 |

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| <b>Lecturers:</b> Mgr. Martin Dovičák, PhD., Mgr. Tomáš Kuchár, PhD., Mgr. Jana Leginusová, PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, PaedDr. Mikuláš Ortutay, Mgr. Júlia Raábová, PhD., Mgr. Tomáš Lovecký |
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| <b>Last change:</b> 16.06.2022 |
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| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |
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## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                                                |       |       |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                                                |       |       |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                                                |       |       |      |
| <b>Course ID:</b><br>FMFI.KEF/1-FYZ-315/15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       | <b>Course title:</b><br>Statistical Physics and Thermodynamics |       |       |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 / 2 <b>per level/semester:</b> 52 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                               |       |                                                                |       |       |      |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                                                |       |       |      |
| <b>Recommended semester:</b> 7.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                                                |       |       |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                                                |       |       |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                                |       |       |      |
| <b>Course requirements:</b><br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 20/80                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                                                |       |       |      |
| <b>Learning outcomes:</b><br>After completing the course, students will be acquainted with the basic concepts, methods and laws and the simplest applications in the field of thermodynamics and statistical physics.                                                                                                                                                                                                                                                                                                                                                  |       |                                                                |       |       |      |
| <b>Class syllabus:</b><br>Basic knowledge of molecules, random variables, kinetic theory of gases, reversible processes in an ideal gas, first and second thermodynamic laws, entropy, statistical ensembles (micro-canonical, canonical and grand-canonical), quantum ideal gases, Bose-Einstein distribution, Fermi-Dirac distribution, thermodynamic potentials, van der Waals equation, phase transitions, elementary analysis of transport phenomena, degenerate Fermi gas, black body radiation, Bose condensation, heat capacity of solids, chemical reactions. |       |                                                                |       |       |      |
| <b>Recommended literature:</b><br>Fundamentals of statistical and thermal physics / Federick Reif. Singapore : McGraw-Hill, [1965]                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                                                |       |       |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                                |       |       |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                                                |       |       |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 252                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                                                |       |       |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | B     | C                                                              | D     | E     | FX   |
| 30,95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 11,51 | 15,08                                                          | 10,71 | 26,98 | 4,76 |
| <b>Lecturers:</b> doc. RNDr. Richard Hlubina, DrSc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                                                |       |       |      |
| <b>Last change:</b> 18.05.2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                                                |       |       |      |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                                                |       |       |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                                          |      |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                          |      |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                                          |      |      |      |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-133/18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       | <b>Course title:</b><br>Supplementary English Course (1) |      |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                                          |      |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                                          |      |      |      |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                                          |      |      |      |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                                          |      |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                                          |      |      |      |
| <b>Course requirements:</b><br>tests, homework<br>Scale of assessment (preliminary/final): 100/0 credit - ongoing evaluation<br>Minimum 65 percent of the total points for the assigned work is needed to pass the course. Points can be awarded for attendance, completed homework tasks, and short tests assigned during the course.<br>A 100-93 %<br>B 92-85 %<br>C 84-77 %<br>D 76-70 %<br>E 69-65 %<br>Course prerequisites: <a href="https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezhneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/">https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezhneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/</a> |       |                                                          |      |      |      |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                                          |      |      |      |
| <b>Class syllabus:</b><br>Texts dealing with the most important topics for FMPI majors combining grammar revision with vocabulary needed to pass the A4 English exam.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                                          |      |      |      |
| <b>Recommended literature:</b><br>Study materials are created by the teacher and available in electronic form.<br>Raymond Murphy: Essential Grammar in Use, Cambridge University Press, 1998<br>Michael McCarthy, Felicity O'Dell: English Vocabulary in Use, Cambridge University Press, 1994                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                          |      |      |      |
| <b>Languages necessary to complete the course:</b><br>English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                          |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                          |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 72                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                                          |      |      |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | B     | C                                                        | D    | E    | FX   |
| 52,78                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 19,44 | 6,94                                                     | 4,17 | 4,17 | 12,5 |
| <b>Lecturers:</b> Mgr. Ing. Jana Kočvarová                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                                          |      |      |      |

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|---------------------------------------------------|
| <b>Last change:</b> 11.04.2024                    |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                                          |      |      |       |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                                          |      |      |       |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                                          |      |      |       |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-134/18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       | <b>Course title:</b><br>Supplementary English Course (2) |      |      |       |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                                          |      |      |       |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                                          |      |      |       |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                                          |      |      |       |
| <b>Educational level:</b> I., I.II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                                          |      |      |       |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                                          |      |      |       |
| <b>Course requirements:</b><br>tests, homework<br>Scale of assessment (preliminary/final): 100/0 ENcredit - ongoing evaluation Minimum 65 percent of the total points for the assigned work is needed to pass the course. Points can be awarded for attendance, completed homework tasks, and short tests assigned during the course. A 100-93 % B 92-85 % C 84-77 % D 76-70 % E 69-65 %Course prerequisites: <a href="https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezhneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/">https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezhneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/</a> |       |                                                          |      |      |       |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                          |      |      |       |
| <b>Class syllabus:</b><br>Texts dealing with the most important topics for FMPI majors combining grammar revision with vocabulary needed to pass the A4 English exam.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                                          |      |      |       |
| <b>Recommended literature:</b><br>Study materials are created by the teacher and available in electronic form. Raymond Murphy: Essential Grammar in USe, Cambridge University Press, 1998 Michael McCarthy, Felicity O'Dell: English Vocabulary in Use, Cambridge University Press, 1994                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                                          |      |      |       |
| <b>Languages necessary to complete the course:</b><br>English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                          |      |      |       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                          |      |      |       |
| <b>Past grade distribution</b><br>Total number of evaluated students: 72                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                                          |      |      |       |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | B     | C                                                        | D    | E    | FX    |
| 54,17                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 13,89 | 4,17                                                     | 8,33 | 5,56 | 13,89 |
| <b>Lecturers:</b> Mgr. Ing. Jana Kočvarová                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                          |      |      |       |
| <b>Last change:</b> 11.04.2024                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                                          |      |      |       |

**Approved by:** doc. RNDr. Tomáš Blažek, PhD.

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                               |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                               |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                               |
| <b>Course ID:</b><br>FMFLKTF/1-FYZ-251/15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Course title:</b><br>Theoretical Mechanics |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 / 2 <b>per level/semester:</b> 52 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                               |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                               |
| <b>Recommended semester:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                               |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                               |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                               |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 20/80                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                               |
| <b>Learning outcomes:</b><br>After completing the course, students will understand and be able to use the material listed in the Brief syllabus of the course. In this way they will be well prepared for further theoretical physics courses.                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                               |
| <b>Class syllabus:</b><br>Lagrangian and Hamiltonian formalism, the least action principle, scaling and similar solutions, two-body problem and Kepler's problem, small oscillations, perturbation theory, Euler's equations for solid body rotation, stress tensor and surface forces, ideal and viscous fluid equations, Hook's law, waves in an elastic continuum and in an ideal fluid.                                                                                                                                                                                                                                                                                                                                  |                                               |
| <b>Recommended literature:</b><br>Theoretical mechanics / Miroslav Brdička, Arnošt Hladík. Prague: Academia, 1987<br>Mechanics in Physics / Jan Horský, Jan Novotný, Milan Štefaník. Prague: Academia, 2001<br>Fecko, M. : Extended Syllabus and Problems in Theoretical Mechanics [40 pages, available electronically<br>J.Langer, J.Podolský: Theoretical Mechanics, electronically at <a href="http://utf.mff.cuni.cz/vyuka/OFY003/">http://utf.mff.cuni.cz/vyuka/OFY003/</a><br>J.Tillich, L.Richterek: Classical Mechanics, electronically at <a href="http://muj.optol.cz/richterek/lib/exe/fetch.php?media=mechanika:mechanika.pdf">http://muj.optol.cz/richterek/lib/exe/fetch.php?media=mechanika:mechanika.pdf</a> |                                               |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                               |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                               |

|                                                   |      |       |       |       |       |
|---------------------------------------------------|------|-------|-------|-------|-------|
| <b>Past grade distribution</b>                    |      |       |       |       |       |
| Total number of evaluated students: 280           |      |       |       |       |       |
| A                                                 | B    | C     | D     | E     | FX    |
| 40,36                                             | 12,5 | 11,79 | 10,71 | 11,07 | 13,57 |
| <b>Lecturers:</b> doc. RNDr. Marián Fecko, PhD.   |      |       |       |       |       |
| <b>Last change:</b> 08.03.2022                    |      |       |       |       |       |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD. |      |       |       |       |       |

## COURSE DESCRIPTION

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------------------------------------------------------|-------|-------|-----|
| <b>Academic year:</b> 2025/2026                                                                                                                                                                                                                                                |      |                                                             |       |       |     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                              |      |                                                             |       |       |     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                |      |                                                             |       |       |     |
| <b>Course ID:</b><br>FMFL.KTF/1-FYZ-265/22                                                                                                                                                                                                                                     |      | <b>Course title:</b><br>Theory of the Electromagnetic Field |       |       |     |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 / 2 <b>per level/semester:</b> 52 / 26<br><b>Form of the course:</b> on-site learning                                                       |      |                                                             |       |       |     |
| <b>Number of credits:</b> 7                                                                                                                                                                                                                                                    |      |                                                             |       |       |     |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                                                                |      |                                                             |       |       |     |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                   |      |                                                             |       |       |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                          |      |                                                             |       |       |     |
| <b>Course requirements:</b><br>Continuous assessment: homework, paper<br>Examination: written, with possible oral part<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 20/80                                     |      |                                                             |       |       |     |
| <b>Learning outcomes:</b><br>After completing the course, students should be able to solve Maxwell's equations as partial differential equations in some physically important situations.                                                                                      |      |                                                             |       |       |     |
| <b>Class syllabus:</b><br>basic relations of electrodynamics in vacuum and in media, conservation laws, elmag potentials, electrostatics - solution of Poisson's equation by method of separation of variables and by method of Green's function, elmag waves, elmag radiation |      |                                                             |       |       |     |
| <b>Recommended literature:</b><br>Landau, Lev D.; Lifshitz, Evgeny M. (1975). The Classical Theory of Fields. Vol. 2 (4th ed.). Butterworth-Heinemann.                                                                                                                         |      |                                                             |       |       |     |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                          |      |                                                             |       |       |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                  |      |                                                             |       |       |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 205                                                                                                                                                                                                      |      |                                                             |       |       |     |
| A                                                                                                                                                                                                                                                                              | B    | C                                                           | D     | E     | FX  |
| 33,66                                                                                                                                                                                                                                                                          | 12,2 | 11,71                                                       | 11,22 | 23,41 | 7,8 |
| <b>Lecturers:</b> doc. RNDr. Martin Mojžiš, PhD.                                                                                                                                                                                                                               |      |                                                             |       |       |     |
| <b>Last change:</b> 18.05.2022                                                                                                                                                                                                                                                 |      |                                                             |       |       |     |
| <b>Approved by:</b> doc. RNDr. Tomáš Blažek, PhD.                                                                                                                                                                                                                              |      |                                                             |       |       |     |