Course descriptions

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COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/1-FYZ-115/13	Algebra and Geometry (1)

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 3 / 1 **per level/semester:** 39 / 13
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 1.

Educational level: I.

Prerequisites:

Course requirements:
Continuous assessment: test
Examination: written and oral examination
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 20/80

Learning outcomes:
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.

Class syllabus:
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.

Recommended literature:
Linear Algebra and Geometry: A Journey of Three Dimensions with Overlaps in Related Fields / Pavol Zlatoš. Bratislava: Albert Marenčin, 2011; electronic version available at http://thales.doa.fmph.uniba.sk/zlatos/la/LAG_A4.pdf
We grow linear algebra / Luboš Motl, Miloš Zahradník. Prague: Karolinum, 2002
Lectures on Linear Algebra and Geometry / Július Korbaš, Štefan Gyurki. UK Publishing House, Bratislava, 2013

Languages necessary to complete the course:
Slovak, English

Notes:

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/1-FYZ-160/22	Algebra and Geometry (2)

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 3 / 1 **per level/semester:** 39 / 13
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 2.

Educational level: I.

Prerequisites:

Course requirements:
Continuous assessment: test
Exam: exam
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 20/80

Learning outcomes:
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.

Class syllabus:
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.

Recommended literature:
Linear Algebra and Geometry: A Journey of Three Dimensions with Overlaps in Related Fields / Pavol Zlatoš. Bratislava: Albert Marenčin, 2011; electronic version available at http://thales.doa.fmph.uniba.sk/zlatos/la/LAG_A4.pdf
We grow linear algebra / Luboš Motl, Miloš Zahradník. Prague: Karolinum, 2002

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 350

A	B	C	D	E	FX
20,57	23,43	17,71	20,29	13,43	4,57

Lecturers: prof. RNDr. Pavol Zlatoš, PhD., Mgr. Nina Hronkovičová, PhD.

Last change: 18.05.2022
Approved by: doc. RNDr. Tomáš Blažek, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/1-FYZ-216/22	Algebra and Geometry (3)

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 2 / 1 **per level/semester:** 26 / 13
Form of the course: on-site learning

Number of credits: 4

Recommended semester: 3., 5.

Educational level: I.

Prerequisites:

Course requirements:
Continuous assessment: test 50%
Exam: exam 50%
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 50/50

Learning outcomes:
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.

Class syllabus:
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).

Recommended literature:
Linear Algebra and Geometry: A Journey of Three Dimensions with Overlaps in Related Fields / Pavol Zlatoš. Bratislava: Albert Marenčin, 2011; electronic version available at http://thales.doa.fmph.uniba.sk/zlatos/la/LAG_A4.pdf
We grow linear algebra / Luboš Motl, Miloš Zahradník. Prague: Karolinum, 2002

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 52

A	B	C	D	E	FX
51,92	25,0	13,46	9,62	0,0	0,0

Lecturers: prof. RNDr. Pavol Zlatoš, PhD.
Last change: 18.05.2022
Approved by: doc. RNDr. Tomáš Blažek, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/1-FYZ-421/15	Astronomy and Astrophysics

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 4 / 2 **per level/semester:** 52 / 26
Form of the course: on-site learning

Number of credits: 7

Recommended semester: 5.

Educational level: I.

Prerequisites:

Course requirements:
Continuous Assessment (100%): home assignments 40points, test 60points
Approximate scale of final grades: A 91%, B 81%, C 71%, D 61%, E 51%
Continuous Assessment / Final Examination: 100/0
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
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.

Class syllabus:
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.

Recommended literature:
An introduction to the Sun and Stars / S. Jocelyn Bell Burnell ... [et al.]. Cambridge: Cambridge University Press, 2004
An introduction to the solar system / Philip A. Bland ... [et al.]. Cambridge: Open university, 2004

Fundamentals of Astronomy and Astrophysics / Vladimír Vanýsek. Prague: Academia, 1980
Solar System Physics / M.Brož, M. Šolc. Matfyzpress, 2013

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 73

A	B	C	D	E	FX
53,42	16,44	12,33	5,48	5,48	6,85

Lecturers: prof. RNDr. Juraj Tóth, PhD., RNDr. Roman Nagy, PhD., doc. RNDr. Leonard Kornoš, PhD.

Last change: 20.06.2022

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

STATE EXAM DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KJFB/1-FYZ-991/22	**Course title:** BSc Thesis Defence
Number of credits: 8	
Educational level: I.	
Course requirements: Continuous assessment: According to the progress of the bachelor thesis project based on the assessment of the supervisor. Scale of assessment (preliminary/final): 100/0	
Learning outcomes: Elaboration of bachelor thesis and its defense.	
Class syllabus: According to the assignment of the bachelor's thesis and the instructions of the supervisor	
State exam syllabus:	
Languages necessary to complete the course: Slovak, English	
Last change: 10.03.2022	
Approved by: doc. RNDr. Tomáš Blažek, PhD.	

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/1-FYZ-323/22	Bachelor Thesis Seminar

Educational activities:
Type of activities: seminar / independent work
Number of hours:
per week: 2 / 1 **per level/semester:** 26 / 13
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 6.

Educational level: I.

Prerequisites:

Course requirements:
Interim evaluation: presentation
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): Weight of the intermediate / final evaluation: 100/0

Learning outcomes:
After completing the course, students will be able to present the studied scientific issues and their own results to a professional audience.

Class syllabus:
Issues from professional monographs and scientific periodicals individually determined by the supervisor of the bachelor's thesis.

Recommended literature:
Monographs and original works from scientific periodicals determined individually according to the assignment of the bachelor's thesis

Languages necessary to complete the course:
Slovak / English (study literature in Slovak or English)

Notes:

Past grade distribution
Total number of evaluated students: 48

A	B	C	D	E	FX
93,75	6,25	0,0	0,0	0,0	0,0

Lecturers: doc. Mgr. Jozef Kristek, DrSc.

Last change: 22.02.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/2-FOL-116/15	Basic Electronics

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 3 / 3 **per level/semester:** 39 / 39
Form of the course: on-site learning

Number of credits: 7

Recommended semester: 5.

Educational level: I., II.

Prerequisites:

Course requirements:
Continuous assessment: work on practical exercises (100%). The condition for granting credits is the presentation of a semester project.
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
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.

Class syllabus:
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.

Recommended literature:
The art of electronics / Paul Horowitz, Winfield Hill. New York : Cambridge University Press, 1989

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 138

A	B	C	D	E	FX
96,38	0,0	2,9	0,0	0,0	0,72

Lecturers: doc. RNDr. František Kundracik, CSc., doc. RNDr. Matej Klas, PhD., doc. RNDr. Juraj Országh, PhD.

Last change: 27.06.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAI/1-AIN-407/22	Brain and Mind

Educational activities:
Type of activities: course
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 1., 3., 5.

Educational level: I., I.II.

Prerequisites:

Course requirements:
Continuous assessment: presence (30%), presentation (40%), bonus assignments (30%)
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The course objectives are to make the students familiar with major theories and methods of mind/ brain research.

Class syllabus:
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.

Recommended literature:
S. Blackmore, E.T. Troscianko: Consciousnes. An Introduction. Routledge, third edition 2018.
M.S. Gazzaniga, R.B. Ivry, G.R. Mangun: Cognitive Neuroscience. The Biology of the Mind. W.W. Norton & company, fifth edition 2019.
J. Friedenberg, G. Silverman: Cognitive Science. An Introduction to the Study of Mind. Sage 2012.
T. Metzinger: The Ego Tunnel. The Science of the Mind and the Myth of the self. Basic Books 2009.

Languages necessary to complete the course:
Slovak, English

Notes:

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB/1-FYZ-871/20	Chemical Physics

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 3 / 3 **per level/semester:** 39 / 39
Form of the course: on-site learning

Number of credits: 7

Recommended semester: 6.

Educational level: I.

Prerequisites:

Course requirements:
Continuous assessment: homework
Exam: oral
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
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 51%
Scale of assessment (preliminary/final): Weight of the intermediate / final evaluation: 30/70

Learning outcomes:
Understand the importance of quantum mechanical description of substances at the molecular level - the basis of theoretical approaches to the study of their reactions.
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.

Class syllabus:
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, Hartré approximation, Hartree-Fock approximation, Coulomb and exchange integral.Practical applications for solving the structure of molecules.
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.
Symmetry of molecular systems. Dynamic aspects of molecular systems. Transit state methods, collision theory, quasiclassical trajectory method.Environmental influence - methods of solvation

description. Methods considering dielectric continuum and non-methods considering discrete solvent.

Recommended literature:
Atkins P, Friedman R (2005) Molecular Quantum Mechanics Fourth Edition
Szabo A, Ostlund NS Modern Quantum Chemistry

Languages necessary to complete the course:
Slovak in combination with English (study literature also in English)

Notes:

Past grade distribution
Total number of evaluated students: 26

A	B	C	D	E	FX
50,0	19,23	15,38	7,69	7,69	0,0

Lecturers: doc. RNDr. Peter Papp, PhD., Mgr. Ivan Sukuba, PhD., RNDr. Ing. Milan Melicherčík, PhD.

Last change: 20.06.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAI/1-AIN-408/22	Cognitive Laboratory

Educational activities:
Type of activities: course
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1., 3., 5.

Educational level: I., I.II.

Prerequisites:

Course requirements:
Interim evaluation: presentations
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Acquisition of methods for studying various cognitive phenomena (data collection and analysis) using an online cognitive laboratory.

Class syllabus:
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.

Recommended literature:
CogLab / Greg Francis, Ian Neath, Daniel R. VanHorn. Thomson/Wadsworth, 2014

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 106

A	B	C	D	E	FX
67,92	11,32	8,49	0,94	0,0	11,32

Lecturers: doc. PhDr. Ján Rybár, PhD.

Last change: 17.05.2024

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/1-FYZ-232/22	Computational Physics

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 1 / 2 **per level/semester:** 13 / 26
Form of the course: on-site learning

Number of credits: 4

Recommended semester: 4.

Educational level: I.

Prerequisites:

Course requirements:
Continuous assessment: elaboration of homework for individual lectures.
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
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, ...)..

Class syllabus:
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.

Recommended literature:
W. H. Press et al..: Numerical Recipes. Cambridge Univ. Press, 1992

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 262

A	B	C	D	E	FX
57,25	9,54	7,63	6,11	8,02	11,45

Lecturers: doc. RNDr. Peter Papp, PhD., doc. Mgr. Jozef Kristek, DrSc.

Last change: 17.05.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/1-FYZ-217/22	Electromagnetism

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 4 / 2 **per level/semester:** 52 / 26
Form of the course: on-site learning

Number of credits: 7

Recommended semester: 3.

Educational level: I., I.II.

Prerequisites:

Course requirements:
Continuous assessment: written work
Exam: oral + written
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 50/50

Learning outcomes:
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.

Class syllabus:
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.

Recommended literature:
A. Tirpák: Elektromagnetizmus. Iris (2011)
D. Halliday, R. Resnick, J. Walker: Fyzika 1-5, Akademické nakladatelství VUTIUM (2007)

Languages necessary to complete the course:
Slovak / English (study literature in Slovak or English)

Notes:

Past grade distribution
Total number of evaluated students: 139

A	B	C	D	E	FX
25,9	11,51	17,99	10,79	17,27	16,55

Lecturers: doc. RNDr. František Kundracik, CSc., Mgr. Róbert Astaloš, PhD., doc. RNDr. Radoslav Böhm, PhD.
Last change: 14.03.2022
Approved by: doc. RNDr. Tomáš Blažek, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-233/13	English Conversation Course (1)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 3., 5.

Educational level: I., I.II., II.

Prerequisites:

Course requirements:
tests, presentations, essays
Course prerequisites:
https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
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.

Class syllabus:
This course's focus is to broaden spoken/communicational English for students with B2/C1 level of English knowledge.

Recommended literature:
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).

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 318

A	B	C	D	E	FX
77,36	8,81	4,4	1,26	0,94	7,23

Lecturers: Mgr. Aneta Barnes

Last change: 11.04.2024
Approved by: doc. RNDr. Tomáš Blažek, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-234/13	English Conversation Course (2)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 4., 6.

Educational level: I., I.II., II.

Prerequisites:

Course requirements:
tests, oral presentations, essays
Course prerequisites:
https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
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.

Class syllabus:
This course's focus is to broaden spoken/communicational English for students with B2/C1 level of English knowledge(Upper-Intermediate/Lower Advanced).

Recommended literature:
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).

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 201

A	B	C	D	E	FX
82,09	8,96	2,49	1,0	0,0	5,47

Lecturers: Mgr. Aneta Barnes

Last change: 11.04.2024
Approved by: doc. RNDr. Tomáš Blažek, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-131/00	English Language (1)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: I., I.II.

Prerequisites:

Course requirements:
Grades: A 93%, B 85%, C 77%, D 70%, E 65%
Course prerequisites:
https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
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.

Class syllabus:
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 mathemathics.

Recommended literature:
Anglický jazyk pre študentov FMFI UK : Kurz pre mierne pokročilých / Alena Zemanová.
Učebnica je nepublikovaná, k dispozícii v elektronickej podobe na webovej stránke KJP.
Anglický jazyk pre študentov FMFI UK : Aplikovaná matematika / Alexandra Maďarová, Ľubomíra Kožehubová.- učebnica publikovaná online
Anglický jazyk pre študentov FMFI UK : Matematika: Alexandra Maďarová, Eva Foltánová.
Učebnica je nepublikovaná, k dispozícii v elektronickej podobe na webovej stránke KJP.
Anglický jazyk pre študentov FMFI UK : Fyzika / Alena Zemanová.
Učebnica je nepublikovaná, k dispozícii v elektronickej podobe na webovej stránke KJP.
Anglický jazyk pre študentov FMFI UK : Informatika / Elena Klátiková.
Učebnica je nepublikovaná, k dispozícii v elektronickej podobe na webovej stránke KJP.

Languages necessary to complete the course:

Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 7538

A	B	C	D	E	FX
29,53	22,82	18,16	12,52	7,87	9,1

Lecturers: Mgr. Eva Foltánová, Mgr. Ing. Jana Kočvarová, Mgr. Ľubomíra Koženhubová, Mgr. Alexandra Maďarová, Mgr. Aneta Barnes, Mgr. Simona Dobiašová, PhD., Mgr. Valéria Medárová, PhD., Mgr. Katarína Hromadová, PhD.

Last change: 16.09.2025

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-132/00	English Language (2)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2.

Educational level: I., I.II.

Prerequisites:

Course requirements:
Grades: A 93%, B 85%, C 77%, D 70%, E 65%
Course prerequisites:
https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
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.

Class syllabus:
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.

Recommended literature:
Anglický jazyk pre študentov FMFI UK : Kurz pre mierne pokročilých / Alena Zemanová.
The textbook has not been published. It is at students' disposal in an electronic format.

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 1733

A	B	C	D	E	FX
22,1	20,95	23,83	14,77	11,08	7,27

Lecturers: Mgr. Ing. Jana Kočvarová, Mgr. Alexandra Maďarová, Mgr. Ľubomíra Kožehubová, Mgr. Eva Foltánová, Mgr. Aneta Barnes, Mgr. Simona Dobiašová, PhD., Mgr. Valéria Medárová, PhD.
Last change: 20.06.2022
Approved by: doc. RNDr. Tomáš Blažek, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-231/00	English Language (3)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 3.

Educational level: I., I.II.

Prerequisites:

Course requirements:
Grades: A 93%, B 85%, C 77%, D 70%, E 65%
Course prerequisites:
https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
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.

Class syllabus:
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 mathemathics.
The subject requires advanced knowledge of general English.

Recommended literature:
Anglický jazyk pre študentov FMFI UK : Kurz pre mierne pokročilých / Alena Zemanová.
Učebnica je nepublikovaná, k dispozícii v elektronickej podobe na webovej stránke KJP.
Anglický jazyk pre študentov FMFI UK : Aplikovaná matematika / Alexandra Maďarová, Ľubomíra Kožehubová.- učebnica publikovaná online
Anglický jazyk pre študentov FMFI UK : Matematika: Alexandra Maďarová, Eva Foltánová.
Učebnica je nepublikovaná, k dispozícii v elektronickej podobe na webovej stránke KJP.
Anglický jazyk pre študentov FMFI UK : Fyzika / Alena Zemanová.
Učebnica je nepublikovaná, k dispozícii v elektronickej podobe na webovej stránke KJP.
Anglický jazyk pre študentov FMFI UK : Informatika / Elena Klátiková.
Učebnica je nepublikovaná, k dispozícii v elektronickej podobe na webovej stránke KJP.

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 1461

A	B	C	D	E	FX
15,47	18,96	22,72	18,21	18,14	6,5

Lecturers: 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.

Last change: 16.09.2025

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-232/10	English Language (4)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 4.

Educational level: I., I.II.

Prerequisites:

Course requirements:
Examination: an examination consisting of a written and an oral part.
Grades: A 93%, B 85%, C 77%, D 70%, E 65%
Course prerequisites:
https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/skuska-z-predmetu-anglicky-jazyk-4/
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
After completing the course, students will be able to work independently with professional literature in English

Class syllabus:
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 mathemathics.

Recommended literature:
Anglický jazyk pre študentov FMFI UK : Kurz pre mierne pokročilých / Alena Zemanová.
Učebnica je nepublikovaná, k dispozícii v elektronickej podobe na webovej stránke KJP.
Anglický jazyk pre študentov FMFI UK : Aplikovaná matematika / Alexandra Maďarová, Ľubomíra Kožehubová.- učebnica publikovaná online
Anglický jazyk pre študentov FMFI UK : Matematika: Alexandra Maďarová, Eva Foltánová.
Učebnica je nepublikovaná, k dispozícii v elektronickej podobe na webovej stránke KJP.
Anglický jazyk pre študentov FMFI UK : Fyzika / Alena Zemanová.
Učebnica je nepublikovaná, k dispozícii v elektronickej podobe na webovej stránke KJP.
Anglický jazyk pre študentov FMFI UK : Informatika / Elena Klátiková.
Učebnica je nepublikovaná, k dispozícii v elektronickej podobe na webovej stránke KJP.

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 4299

A	B	C	D	E	FX
25,17	28,15	21,61	11,82	6,05	7,21

Lecturers: Mgr. Ing. Jana Kočvarová, Mgr. Alexandra Maďarová, Mgr. Ľubomíra Kožehubová, Mgr. Eva Foltánová, Mgr. Aneta Barnes, Mgr. Simona Dobiašová, PhD., Mgr. Valéria Medárová, PhD.

Last change: 16.09.2025

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF+KAFZM/1-FYZ-122/25	Error analysis - statistics for physicists

Educational activities:
Type of activities: course
Number of hours:
per week: 3 **per level/semester:** 39
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 2.

Educational level: I.

Prerequisites:

Course requirements:
Interim evaluation: tests
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
After completing the course, students will be able to use statistical approaches to process measured data.

Class syllabus:
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.
Testing of statistical hypotheses - parametric and nonparametric tests. Multidimensional data processing - independence tests.
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.

Recommended literature:
Andel, J.: Statistické metody. Matfyzpress Praha 2019.
Terek M.: Interpretácia štatistiky a dát. Equilibria 2017.
F.Kundracik: Spracovanie experimentálnych dát. Univerzita Komenského 1999.
Hogg, R., Ledolter, J.: Applied Statistics for Engineers and Physical Scientists. Maxwell Macmillan International 1987

Languages necessary to complete the course:
Slovak / English (study literature in Slovak or English).

Notes:

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTF/1-FYZ-118/16	Exercises from Mechanics (1)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: I.

Prerequisites:

Course requirements:
Continuous assessment: papers
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Weight of the intermediate / final evaluation: 100/0
Scale of assessment (preliminary/final): Weight of the intermediate / final evaluation: 100/0

Learning outcomes:
Mechanics

Class syllabus:
Additional exercise for the subject Mechanics (1). We will practice more simple examples of this subject.

Recommended literature:
Physics part 1: Mechanics / D. Halliday, R. Resnick, J. Walker / VÚT in Brno, 2003
Physics I. / Dionýz Ilkovič / Bratislava, Alfa, 1972
Feynman lectures in physics 1 / R.P. Feynman, R.B. Leighton, M. Sands / Nakladatelsví Fragment, 2013
Electronic texts of the presentation on the website of the subject Mechanics (1)

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 303

A	B	C	D	E	FX
32,67	19,14	18,48	15,18	5,61	8,91

Lecturers: Mgr. Peter Maták, PhD.

Last change: 09.03.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTF/1-FYZ-119/16	Exercises from Mechanics (2)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2.

Educational level: I.

Prerequisites:

Course requirements:
Continuous assessment: papers
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Weight of the intermediate / final evaluation: 100/0
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

Learning outcomes:
Mechanics.

Class syllabus:
Additional exercise for the subject Mechanics (2). We will practice more simple examples of this subject.

Recommended literature:
Physics part 2: Mechanics / D. Halliday, R. Resnick, J. Walker / Brno University of Technology, 2003
Physics I. / Dionýz Ilkovič / Bratislava, Alfa, 1972
Feynman lectures in physics 1 / R.P. Feynman, R.B. Leighton, M. Sands / Nakladatelsví Fragment, 2013
Electronic texts of the presentation on the website of the subject Mechanics (2)

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 209

A	B	C	D	E	FX
40,67	22,49	17,22	11,48	2,87	5,26

Lecturers: Mgr. Peter Maták, PhD.

Last change: 09.03.2022
Approved by: doc. RNDr. Tomáš Blažek, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB/1-FYZ-401/22	Fields of Physical Research

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2.

Educational level: I., I.II.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
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.

Class syllabus:
Each week a lecture from one of the modern directions of research at the faculty.

Recommended literature:

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 256

A	B	C	D	E	FX
98,05	0,39	1,56	0,0	0,0	0,0

Lecturers: prof. RNDr. Jozef Masarik, DrSc.

Last change: 24.02.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTF/1-FYZ-324/22	Foundations of Meteorology

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 4 / 2 **per level/semester:** 52 / 26
Form of the course: on-site learning

Number of credits: 7

Recommended semester: 5.

Educational level: I.

Prerequisites:

Course requirements:
Ongoing evaluation:
Examination: oral / written
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): Weight of the intermediate / final evaluation: 0/100

Learning outcomes:
Gain basic knowledge of atmospheric physics

Class syllabus:
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.

Recommended literature:
Pechala Frantisek, Bednar Jan: Pracula dynamicke meteorologie. Prague: Academia, 1991
Meteorology and Climatology / S.P. Chromov (translated by J. Tomlain) / Vydavateľstvo SAV Bratislava, 1968, 456 pages

Languages necessary to complete the course:
Slovak in combination with English (study literature in English)

Notes:

Past grade distribution
Total number of evaluated students: 1

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

Lecturers: doc. RNDr. Martin Gera, PhD., RNDr. Ingrid Damborská, CSc.

Last change: 23.02.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-141/00	French Language (1)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: I., I.II., II.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:

Class syllabus:
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.

Recommended literature:
Capelle Guy, Menand Robert: Le Nouveau taxi 1, Hachette FLE Paris, France 2009, ISBN 978-2-01-155548 - 9

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 499

A	B	C	D	E	FX
48,5	19,44	16,63	7,82	2,0	5,61

Lecturers: Mgr. Ľubomíra Kožehubová

Last change: 20.06.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-142/00	French Language (2)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2.

Educational level: I., I.II., II.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:

Class syllabus:
The subject continues the program of French language (1) and provides courses of essential and intermediate French language.

Recommended literature:
Capelle Guy, Menand Robert: Le Nouveau taxi 1, Hachette FLE Paris, France 2009, ISBN 978-2-01-155548 - 9

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 307

A	B	C	D	E	FX
45,6	22,48	16,94	8,79	2,28	3,91

Lecturers: Mgr. Ľubomíra Kožehubová

Last change: 20.06.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-241/00	French Language (3)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 3.

Educational level: I., I.II., II.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:

Class syllabus:
The subject provides a course of intermediate French language, covering not only general, but also technical language.

Recommended literature:
Capelle Guy, Menand Robert: Le Nouveau taxi 1, Hachette FLE Paris, France 2009, ISBN 978-2-01-155548 - 9

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 128

A	B	C	D	E	FX
48,44	24,22	17,19	5,47	0,78	3,91

Lecturers: Mgr. Ľubomíra Kožehubová

Last change: 20.06.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-242/00	French Language (4)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 4.

Educational level: I., I.II., II.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:

Class syllabus:
The subject provides a course of intermediate French covering not only general, but also technical French language.

Recommended literature:
Menand Robert: Le Nouveau taxi 2, Hachette FLE, Paris, France 2009, ISBN 978-2-01-155551 - 9

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 79

A	B	C	D	E	FX
43,04	32,91	16,46	2,53	1,27	3,8

Lecturers: Mgr. Ľubomíra Kožehubová

Last change: 20.06.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/1-FYZ-212/15	Fundamentals of Programming

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 2 / 2 **per level/semester:** 26 / 26
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 1.

Educational level: I., I.II.

Prerequisites:

Course requirements:
Exam: practical (programming)
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
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, ...).

Class syllabus:
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.

Recommended literature:
Kundracik, F .: Basics of Programming Practically. Vydavateľstvo UK 2013. On-line: http:// www.fmph.uniba.sk/index.php?id=3246
Materials on the course page: http://davinci.fmph.uniba.sk/~kundracik1/ZakladyProgramovania/

Languages necessary to complete the course:
Slovak, English

Notes:

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-151/00	German Language (1)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: I., I.II., II.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
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)

Class syllabus:
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.
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)

Recommended literature:
Appropriate study material is supplied by teacher based on the participants'level of German proficiency.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 874

A	B	C	D	E	FX
38,33	24,71	18,42	8,81	2,86	6,86

Lecturers: Mgr. Alexandra Maďarová, Mgr. Simona Dobiašová, PhD.

Last change: 05.09.2025

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-152/00	German Language (2)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2.

Educational level: I., I.II., II.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
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)

Class syllabus:
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.
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)

Recommended literature:
Appropriate study material is supplied by teacher based on the participants'level of German proficiency

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 542

A	B	C	D	E	FX
38,01	19,56	19,56	12,36	3,51	7,01

Lecturers: Mgr. Alexandra Maďarová, Mgr. Simona Dobiašová, PhD.

Last change: 05.09.2025

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-251/00	German Language (3)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 3.

Educational level: I., I.II., II.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Master the basics of general language and basic professional terminology of individual fields of study (depending on the advanced level of students)

Class syllabus:
The course is a follow-up to the German language (1,2). The subject provides a course of intermediate or advanced German language.
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).

Recommended literature:
Appropriate study material is supplied by teacher based on the participants'level of German proficiency.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 191

A	B	C	D	E	FX
45,03	23,04	19,37	6,81	2,09	3,66

Lecturers: Mgr. Alexandra Maďarová, Mgr. Simona Dobiašová, PhD.

Last change: 05.09.2025

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-252/00	German Language (4)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 4.

Educational level: I., I.II., II.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Master the basics of general language and basic professional terminology of individual fields of study (depending on the advanced level of students)

Class syllabus:
The course is a follow-up to the German language (1-3). It provides a course of intermediate and advanced German language.
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).

Recommended literature:
Appropriate study material is supplied by teacher based on the participants'level of German proficiency.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 104

A	B	C	D	E	FX
44,23	22,12	14,42	10,58	3,85	4,81

Lecturers: Mgr. Alexandra Maďarová, Mgr. Simona Dobiašová, PhD.

Last change: 05.09.2025

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/1-FYZ-453/22	High Performance Computing for Physicists

Educational activities:
Type of activities: course
Number of hours:
per week: 3 **per level/semester:** 39
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 5.

Educational level: I.

Prerequisites:

Course requirements:
Interim evaluation: elaboration of tasks
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The student will acquire basic knowledge and skills in the field of high-performance computing and parallel programming.

Class syllabus:
Linux/Unix, scripting. Command interpreters, shell, remote access.
Computer architectures, sequential, vector, shared and distributed memory, symmetrical and asymmetric multiprocessing, NUMA, ccNUMA, GPU architecture. Grid.
Parallel programming models, Message Passing Interface (MPI), Application Program Interface (OpenMP). Basics of MPI, MPI implementation, OpenMP basics. GPU programming (CUDA).
Examples of high-performance computing.

Recommended literature:
William Gropp, Ewing Lusk, Anthony Skjellum: Using MPI: Portable Parallel Programming with the Message-Passing Interface, MIT Press, 2014.
Chapman, Barbara; Jost, Gabriele, Pas, Ruud van der: Using OpenMP: portable shared memory parallel programming, MIT Press, 2008.
Richard Blum; Christine Bresnahan: Linux Command Line and Shell Scripting Bible, Wiley, 2021.
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.

Languages necessary to complete the course:
SK, EN

Notes:

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAI/1-MXX-491/22	Inclusive Approaches to Education of Students with Special Educational Needs

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1., 3.

Educational level: I., I.II.

Prerequisites:

Course requirements:
Continuous assessment: active participation in class (elaboration of assigned tasks, participation in discussions)
An exam: -
Indicative assessment level: e.g. A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The student:
- They will get acquainted with the basic characteristics of types of health disadvantage (HR) and will know the consequences of HR on education.
- Gain personal experience from meetings with people with disabilities and will be able to explain and apply the rules of communication with them.
- 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.

Class syllabus:
- Characteristics of basic concepts.
- Disability models.
- Disability legislation.
- Human, communication, information and architectural barriers.
- Impact of disability on education.
- Segregation - integration - inclusion.
- Information access technologies for people with disabilities.
- Possibilities and limits of creating equal conditions for the education of pupils with specific educational needs.
- Inclusive school - education for all.
- The importance of education for the social inclusion of people with disabilities.

Recommended literature:

- 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

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB/1-BMF-311/15	Introduction to Biophysics

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 4 / 2 **per level/semester:** 52 / 26
Form of the course: on-site learning

Number of credits: 7

Recommended semester: 5.

Educational level: I., I.II.

Prerequisites:

Course requirements:
Preliminary evaluation: solving examples
Final exam: oral / written exam
Indicative evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 20/80

Learning outcomes:
To show the students how the processes taking place in living organisms can be explained using physics

Class syllabus:
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.
Solving physical examples associated with the mechanisms of processes in living organisms.

Recommended literature:
Biophysics : An introduction / Roland Glaser. Heidelberg : Springer, 2012
Biomedical applications of introductory physics / Jack A. Tuszynski, John M. Dixon. Hoboken, N.J. : Wiley, 2002
Elementary biophysics : An introduction / P K Srivastava. Harrow : Alpha Science International, 2005

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 35

A	B	C	D	E	FX
65,71	22,86	0,0	0,0	2,86	8,57

Lecturers: prof. RNDr. Tibor Hianik, DrSc., Mgr. Zuzana Garaiová, PhD., Mgr. Veronika Šubjaková, PhD.

Last change: 22.06.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/1-FYZ-231/22	Introduction to Modern Physics

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 4 / 2 **per level/semester:** 52 / 26
Form of the course: on-site learning

Number of credits: 7

Recommended semester: 4.

Educational level: I.

Prerequisites:

Course requirements:
Continuous assessment: homeworks, written tests
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 40/60

Learning outcomes:
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.

Class syllabus:
1. Experiments leading to quantization of electromagnetic field. Photon and its basic properties. Basic physical constants. Physical scales: energy, space, time.
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.
3. Spectral series of a hydrogen atom. Bohr model of the atom. Correspondence principle Spin and magnetic moment of elementary particles
4. Wave function, its physical interpretation. Quantum states: bound (E <0), free (E> 0). Quantum particle diffraction - Young's experiment
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.
6. Orbital momentum, Quantization of momentum and spin.
7. Hydrogen atom, eigenstates, degeneration of energy levels. Spectrum corrections: Zeeman phenomenon, Spin, Stern-Gerlach experiment
8. Multielectron atoms. occupancy of energy levels, Periodic table of elements Atomic spectra, selection rules. X-ray generation, Moseley's law.
9. Double hole potential. Hydrogen molecule ion. Two-state quantum system: ammonia, benzene nucleus, organic molecules spin in a magnetic field. NMR, laser.

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

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/1-FYZ-451/15	Introduction to Plasma Physics and Electrical Discharges

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 4 / 2 **per level/semester:** 52 / 26
Form of the course: on-site learning

Number of credits: 7

Recommended semester: 6.

Educational level: I.

Prerequisites:

Course requirements:
Continuous assessment: no
Final: test, exam
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
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.

Class syllabus:
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.
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.
3. Plasma charge fluctuation, quasi-neutrality of plasma, exact definition of plasma; plasma oscillations, plasma frequency.
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.
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.
6. Dissociative ionization, Townsend (first) ionization coefficient, ionization function, Wannier equation; negative ion formation, electron affinity, electronegative and electropositive gases,

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 / editorsA. 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

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/1-FYZ-452/22	Introduction to Solid State Physics

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 4 / 2 **per level/semester:** 52 / 26
Form of the course: on-site learning

Number of credits: 7

Recommended semester: 6.

Educational level: I., II.

Prerequisites:

Antirequisites: FMFI.KEF/1-FYZ-452/18

Course requirements:
Continuous assessment: homework, 2 papers
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): Weight of the intermediate / final evaluation: 100/0

Learning outcomes:
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.

Class syllabus:
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.

Recommended literature:
http://www.st.fmph.uniba.sk/~hlubina1/
Condensed matter physics : Corrected printing / Michael P. Marder. John Wiley, 2000
Solid-State Physics / H. Ibach, H. Lüth. Springer, 2003
Úvod do fyziky pevných látek / Charles Kittel. Academia, 1985

Languages necessary to complete the course:
Slovak, English

Notes:

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF+KAFZM/1-FYZ-807/22	Introduction to optical and laser spectroscopy

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 2 / 1 **per level/semester:** 26 / 13
Form of the course: on-site learning

Number of credits: 4

Recommended semester: 6.

Educational level: I.

Prerequisites:

Recommended prerequisites:
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)
or 1-FYZ-211/17 Electromagnetism and Optics (Physics 2/W)

Course requirements:
Ongoing evaluation:
Examination: oral / written
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
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.

Class syllabus:
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.

Recommended literature:
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

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KEF/1-FYZ-806/22	**Course title:** Introduction to optics, lasers, spectroscopic, interference and scattering methods
Educational activities: **Type of activities:** lecture **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 3	
Recommended semester: 5.	
Educational level: I.	
Prerequisites:	
Recommended prerequisites: 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) or 1-FYZ-211/17 Electromagnetism and Optics (Physics 2/W)	
Course requirements: Final evaluation: Examination: oral / written Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 0/100	
Learning outcomes: The student will gain basic knowledge of optics, spectrometers, interference and scattering techniques. detectors, lasers and their use.	
Class syllabus: 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.	
Recommended literature: 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: prof. RNDr. Pavel Veis, CSc., doc. RNDr. Tomáš Roch, Dr. techn.

Last change: 21.06.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAI/1-AIN-406/22	Language and Cognition

Educational activities:
Type of activities: course
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 2., 4., 6.

Educational level: I., I.II.

Prerequisites:

Course requirements:
Continuous assessment: presentations, bonus assignments
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Acquisition of the most important current theories and methods of studying natural language and cognitive processes.

Class syllabus:
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.

Recommended literature:
G. Dorren: Babel. Around the World in 20 Languages. Profile Books, 2019
S. Pinker: Language Instinct. ſBrilliance Audio, 2014
S. Pinker: The Stuff of Thought. Language as a Window Into Human Nature. Penguin Books 2008
S. Pinker: Words and Rules. The lngredients of Language. Basic Books 2015

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 172

A	B	C	D	E	FX
37,79	23,84	15,12	11,05	5,23	6,98

Lecturers: doc. PhDr. Ján Rybár, PhD.

Last change: 17.05.2024
Approved by: doc. RNDr. Tomáš Blažek, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/1-FYZ-411/22	Linear Algebra Classes (1)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 1 **per level/semester:** 13
Form of the course: on-site learning

Number of credits: 1

Recommended semester: 1.

Educational level: I.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
It is a supplementary exercise to "Algebra and Geometry (1)".

Recommended literature:
Linear Algebra and Geometry: A Journey of Three Dimensions with Overlaps in Related Fields / Pavol Zlatoš. Bratislava: Albert Marenčin, 2011; electronic version available at http://thales.doa.fmph.uniba.sk/zlatos/la/LAG_A4.pdf

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 293

A	B	C	D	E	FX
43,0	15,7	15,7	8,87	9,56	7,17

Lecturers: prof. RNDr. Pavol Zlatoš, PhD., Mgr. Marián Poturnay

Last change: 18.05.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/1-FYZ-412/22	Linear Algebra Classes (2)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 1 **per level/semester:** 13
Form of the course: on-site learning

Number of credits: 1

Recommended semester: 2.

Educational level: I.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
It is a supplementary exercise to "Algebra and Geometry (1)".

Recommended literature:
Linear Algebra and Geometry: A Journey of Three Dimensions with Overlaps in Related Fields / Pavol Zlatoš. Bratislava: Albert Marenčin, 2011; electronic version available at http://thales.doa.fmph.uniba.sk/zlatos/la/LAG_A4.pdf

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 163

A	B	C	D	E	FX
52,76	10,43	11,04	6,75	12,88	6,13

Lecturers: prof. RNDr. Pavol Zlatoš, PhD., Mgr. Nina Hronkovičová, PhD.

Last change: 18.05.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB+KTF/1-FYZ-116/22	Mathematical Methods in Physics (1)

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 4 / 2 **per level/semester:** 52 / 26
Form of the course: on-site learning

Number of credits: 7

Recommended semester: 1.

Educational level: I.

Prerequisites:

Antirequisites: FMFI.KJFB/1-FYZ-116/15

Course requirements:
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%).
Scale of assessment (preliminary/final): 30/70

Learning outcomes:
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.

Class syllabus:
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).

Recommended literature:
Matematika pre fyzikov / A. Grega, D. Kluvanec, E. Rajčan. Bratislava : Slovenské pedagogické nakladateľstvo, 1974
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

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB+KTF/1-FYZ-117/22	Mathematical Methods in Physics (2)

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 4 / 2 **per level/semester:** 52 / 26
Form of the course: on-site learning

Number of credits: 7

Recommended semester: 2.

Educational level: I.

Prerequisites:

Antirequisites: FMFI.KJFB/1-FYZ-117/15

Course requirements:
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%).
Scale of assessment (preliminary/final): 30/70

Learning outcomes:
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.

Class syllabus:
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,

data processing elements, arithmetic mean error, data fitting, minimization of the sum of squares). Partial DR and their use in physics (wave equation, methods of solving partial DR) Numerical methods for solving partial DR.

Recommended literature:

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 295

A	B	C	D	E	FX
23,73	14,58	19,66	17,29	17,29	7,46

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

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTF/1-FYZ-677/15	Mathematical Physics

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 4 / 2 **per level/semester:** 52 / 26
Form of the course: on-site learning

Number of credits: 7

Recommended semester: 5.

Educational level: I., II.

Prerequisites:

Course requirements:
Continuous assessment: homework
Examination: two written exams during the semester
Indicative rating scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
After completing the course, students will be able to use the material contained in the Brief syllabus.

Class syllabus:
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.

Recommended literature:
Differential geometry and Lie groups for physicists / Marián Fecko. Cambridge : Cambridge University Press, 2006
Crampin,Pirani: Applicable differential geometry, CUP 1986

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 84

A	B	C	D	E	FX
48,81	16,67	16,67	5,95	5,95	5,95

Lecturers: doc. RNDr. Marián Fecko, PhD.

Last change: 11.08.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KMANM/1-FYZ-120/17	Mathematics (1)

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 5 / 3 **per level/semester:** 65 / 39
Form of the course: on-site learning

Number of credits: 9

Recommended semester: 1.

Educational level: I.

Prerequisites:

Course requirements:
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.
Exam: The exam consists of a written and an oral part.
Indicative assessment scale: A 92%, B 84%, C 76%, D 68%, E 60%
Scale of assessment (preliminary/final): 50/50

Learning outcomes:
The student will learn the basics of differential and integral calculus of functions of one real variable.

Class syllabus:
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).

Recommended literature:
Analysis 1: Forster Otto, Vieweg, Springer Spektrum, 2015
Mathematics 1: For the study of technical sciences / I. Kluvánek ... [et al.]. Bratislava: SVTL, 1966
Exercises in Mathematical Analysis I / Zbyněk Kubáček, Ján Valášek. Bratislava: Comenius University, 2001
Collection of tasks and exercises in mathematical analysis / Boris Pavlovič Děmidovič; translated from the Russian original by Miroslav Rozložník and Miroslav Tůma. Havlickuv Brod: Fragment, 2003

Languages necessary to complete the course:
slovenský, anglický

Notes:

Past grade distribution
Total number of evaluated students: 438

A	B	C	D	E	FX
13,47	7,53	12,79	13,47	27,63	25,11

Lecturers: prof. RNDr. Ján Filo, CSc., Mgr. Zuzana Šinská, RNDr. Patrik Mihala, PhD.

Last change: 21.06.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KMANM/1-FYZ-135/17	Mathematics (2)

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 5 / 3 **per level/semester:** 65 / 39
Form of the course: on-site learning

Number of credits: 9

Recommended semester: 2.

Educational level: I.

Prerequisites:

Course requirements:
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.
Exam: The exam consists of a written and an oral part.
Indicative assessment scale: A 92%, B 84%, C 76%, D 68%, E 60%
Scale of assessment (preliminary/final): 50/50

Learning outcomes:
The student will learn the basics of differential and integral calculus of functions of one real variable in parts: infinite series and Riemann integral.

Class syllabus:
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.

Recommended literature:
Analysis I, Forster Otto, Vieweg, Springer Spectrum, 2015
Mathematics for the Study of Technical Sciences: Parts 1 and 2 / Igor Kluvánek, Ladislav Mišík, Marko Švec. Bratislava: Alfa, 1970
Exercises in Mathematical Analysis I and II / Zbyněk Kubáček, Ján Valášek. Bratislava: Comenius University, 1996
Collection of tasks and exercises in mathematical analysis / Boris Pavlovič Děmidovič; translated from the Russian original by Miroslav Rozložník and Miroslav Tůma. Havlickuv Brod: Fragment, 2003

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 302

A	B	C	D	E	FX
13,91	12,25	12,58	19,21	23,18	18,87

Lecturers: prof. RNDr. Ján Filo, CSc., RNDr. Patrik Mihala, PhD., Mgr. Zuzana Šinská

Last change: 21.06.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KMANM/1-FYZ-215/17	Mathematics (3)

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 5 / 3 **per level/semester:** 65 / 39
Form of the course: on-site learning

Number of credits: 8

Recommended semester: 3.

Educational level: I.

Prerequisites:

Course requirements:
Continuous assessment, final exam.
Grades: A (100-91), B (90-81), C (80-71), D (70-61), E (60-51), Fx (50-0).
Scale of assessment (preliminary/final): 70/30: detailed 30 for midterm and 30 for exam, bonus: 10 quick tests during lectures

Learning outcomes:
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.

Class syllabus:
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.

Recommended literature:
Demetrian, M., Integrály v R6N, integrály závislé od parametra, krivkové a plošné integrály, Univerzita Komenského : Bratislava, 2023
Kluvánek, I., Mišík, L., Švec M .: (1961) Mathematics II, SVTL Bratislava.
M. Demetrian, Fourier series and Fourier integral, Bratislava, UK, 2012
Boris Pavlovič Děmidovič, Collection of Problems and Exercises in Mathematical Analysis, Fragment Publishing House, 2003
Eliáš, J., Horváth, J., Kajan, J .: (1972) Collection of problems in higher mathematics , IV, SNTL Bratislava.

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 327

A	B	C	D	E	FX
7,95	8,26	9,17	13,15	35,78	25,69

Lecturers: doc. RNDr. Michal Demetrian, PhD., RNDr. Michal Pospíšil, PhD.

Last change: 11.09.2025

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KMANM/1-FYZ-225/15	Mathematics (4)

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 4 / 2 **per level/semester:** 52 / 26
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 4.

Educational level: I.

Prerequisites:

Recommended prerequisites:
1-FYZ-215 Mathematics (3)

Course requirements:
Evaluation during semester: 3 written tests 20 points each.
Final exam: written test (40 points).
Requirements for the final exam: minimum of 30 points from semestral evaluation.
Final evaluation:
100 - 90 A,
89 - 80 B,
79 - 70 C,
69 - 60 D,
59 - 50 E,
less than 50 FX.
Scale of assessment (preliminary/final): 60/40

Learning outcomes:
The student will be familiar with the methods and applications of the theory of functions of a complex variable.

Class syllabus:
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.

Recommended literature:
Mathematics for the study of technical sciences: 2 works / I. Kluvánek ... [et al.]. Bratislava: SVTL, 1965
Fundamentals of the theory of functions of a complex variable / Michal Demetrian. Bratislava: Comenius University, 2012

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 253

A	B	C	D	E	FX
10,28	6,32	9,09	16,6	39,92	17,79

Lecturers: Mgr. Július Pačuta, PhD., RNDr. Michal Pospíšil, PhD.

Last change: 17.06.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KMANM/1-FYZ-350/22	Mathematics (5)

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 2 / 2 **per level/semester:** 26 / 26
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 6.

Educational level: I.

Prerequisites:

Course requirements:
interim and final exam:
continuous examination: tests(45%); final exam: written test(35%) and oral examination(20%)
Grades:
100-91% (A); 90-81% (B); 80-71% (C); 70-61% (D); 60-51% (E), 50-0% (Fx)
Scale of assessment (preliminary/final): 45/55

Learning outcomes:
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.

Class syllabus:
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.

Recommended literature:
Ordinary differential equations / Michal Greguš, Marko Švec, Valter Šeda. Bratislava: Alfa, 1985
Michal Demetrian, Ordinary Differential Equations, Comenius University 2013

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 42

A	B	C	D	E	FX
50,0	23,81	21,43	4,76	0,0	0,0

Lecturers: prof. RNDr. Milan Medveď, DrSc., RNDr. František Jaroš, PhD., Mgr. Iryna Zabaikina, PhD.

Last change: 21.06.2022
Approved by: doc. RNDr. Tomáš Blažek, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KMANM/1-FYZ-370/22	Mathematics (6)

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 2 / 2 **per level/semester:** 26 / 26
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 6.

Educational level: I.

Prerequisites: 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)

Antirequisites: FMFI.KMANM/1-FYZ-370/15

Course requirements:
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.
Exam: The exam consists of a written and an oral part.
Indicative assessment scale: A 92%, B 84%, C 76%, D 68%, E 60%
Scale of assessment (preliminary/final): 50/50

Learning outcomes:
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.

Class syllabus:
1. First order linear PDR (method of characteristics)
2. Wave equation - d´Alambert's formula, Kirchhoff's formula, Duhamel's principle
3. Heat conduction equation
4. Method of separation of variables
5. Laplace equation

Recommended literature:
Partial differential equations / Lawrence C. Evans. Providence: American Mathematical Society, 1998
Partial differential equations: An introduction / Walter A. Strauss. Hoboken: Wiley, 2008
Mathematical Physics: Basic Equations and Special Functions / Vasily Yakovlevich Arsenin; translated by Jozef Kačur. Bratislava: Alfa, 1977

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 3

A	B	C	D	E	FX
0,0	0,0	33,33	33,33	33,33	0,0

Lecturers: prof. RNDr. Ján Filo, CSc., RNDr. Kristína Rostás, PhD.

Last change: 10.03.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KMANM/1-FYZ-405/22	Mathematics Classes (1)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: I.

Prerequisites:

Course requirements:
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The student will learn the basics of differential and integral calculus of functions of one real variable.

Class syllabus:
Support exercise for the course Mathematics (1):
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.
Giving a sufficient number of suggestions for homework and consulting solutions to these tasks.

Recommended literature:
The current textbooks recommended by the course teacher.

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 347

A	B	C	D	E	FX
72,62	8,65	4,03	2,02	8,36	4,32

Lecturers: RNDr. Michal Pospíšil, PhD., RNDr. František Jaroš, PhD.

Last change: 17.05.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KMANM/1-FYZ-406/22	Mathematics Classes (2)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2.

Educational level: I.

Prerequisites:

Course requirements:
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The student will learn the basics of differential and integral calculus of functions of one real variable in parts: infinite series and Riemann integral.

Class syllabus:
Support exercise for the course Mathematics (2):
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.
Giving a sufficient number of suggestions for homework and consulting solutions to these tasks.

Recommended literature:

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 222

A	B	C	D	E	FX
64,41	12,61	1,8	5,41	7,21	8,56

Lecturers: RNDr. Michal Pospíšil, PhD., Mgr. Zuzana Šinská

Last change: 17.05.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KMANM/1-FYZ-407/22	Mathematics Classes (3)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 3.

Educational level: I.

Prerequisites:

Course requirements:
Active participation in the subject.
Grades: A (100-91), B (90-81), C (80-71), D (70-61), E (60-51), Fx (50-0).
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
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.

Class syllabus:
Support exercise for the course Mathematics (3):
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.
Giving a sufficient number of suggestions for homework and consulting solutions to these tasks.

Recommended literature:
Kluvánek, Mišík, Švec, Matematika II, Alfa: Bratislava
Eliáš, Horváth, Kajan, Šulka, Zbierka úloh z vyššej matematiky (4), SNTL: Bratislava
Demidovič, Zbírka úloh z matematické analysy, Praha
Demetrian, Fourierove rady a Fourierov integrál, Univerzita Komenského v Bratislave

Languages necessary to complete the course:
Slovak, English

Notes:

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KMANM/1-FYZ-408/22	Mathematics Classes (4)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 4.

Educational level: I.

Prerequisites:

Recommended prerequisites:
1-FYZ-215 Mathematics (3)

Course requirements:
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
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The student will be familiar with the methods and applications of the theory of functions of a complex variable.

Class syllabus:
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 Rouche's theorem. Open mapping theorem.

Recommended literature:
M. Demetrian, Základy teórie funkcií komplexmej premennej - exercises

Languages necessary to complete the course:
slovak, english

Notes:

Past grade distribution
Total number of evaluated students: 220

A	B	C	D	E	FX
60,45	4,55	8,64	10,91	7,27	8,18

Lecturers: RNDr. Michal Pospíšil, PhD., Mgr. Július Pačuta, PhD.
Last change: 17.06.2022
Approved by: doc. RNDr. Tomáš Blažek, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB+KTF/1-FYZ-111/15	Mechanics (1)

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 4 / 2 **per level/semester:** 52 / 26
Form of the course: on-site learning

Number of credits: 7

Recommended semester: 1.

Educational level: I.

Prerequisites:

Course requirements:
Assesment during the semester: homeworks, written tests
Final exam: written test and oral exam
Approximate scale of final grades: A 90%, B 80%, C 70%, D 60%, E 50%

Learning outcomes:
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.

Class syllabus:
Physical quantities and units
Kinematics of point-like objects, velocity, acceleration
Vector quantities, centripetal acceleration
Motion with constant acceleration
Motion in constant gravitational field, projectile motion, energy conservation law
Newton laws of mechanics
Law of inertial movement, inertial frame of reference, uniform straight line motion
law of force, numerical solution for ballistic curve
Fundamentals of physics methodology, state of a system, change of state, equation of motion
Rotation, angular velocity
momentum of a system of point objects, conservation law
angular momentum, conservation law
tensor of inertia, Newton laws for simple rotational movements
static friction, dynamic friction
equilibrium conditions
scalar product, work of arbitrary force
Newton gravitation law, gravitation potential, energy conservation
Kepler laws

Circular motion in gravitation field
Harmonic oscillator
Hooks law for spring
Damped harmonic oscillator, resonance effect, lifetime/frequency uncertainty principle
Mathematical and physical pendulum

Recommended literature:
Halliday, Resnick, Walker: Fundamentals of physics
Feynman lectures on physics

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 459

A	B	C	D	E	FX
18,74	10,68	9,59	8,06	21,35	31,59

Lecturers: doc. RNDr. Martin Mojžiš, PhD., Mgr. Peter Maták, PhD.

Last change: 11.04.2017

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB+KTF/1-FYZ-112/15	Mechanics (2)

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 4 / 2 **per level/semester:** 52 / 26
Form of the course: on-site learning

Number of credits: 7

Recommended semester: 2.

Educational level: I.

Prerequisites:

Course requirements:
Priebežné hodnotenie: domáce úlohy, písomka
Skúška: písomná a ústna
Orientačná stupnica hodnotenia: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 40/60

Learning outcomes:
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

Class syllabus:
Elements of elasticity theory on the example of prism deformations, pressure and shear stress, Young's modulus.
Movement of coupled oscillators.
Chain of bound oscillators, continuous limit.
Wave equation and its solution, normal modes, Fourier decomposition.
Elastic waves in the continuum, sound, Doppler principle
Fluids, Pascal's law
Archimedes' law, Statics of fluids
Ideal fluid motion, Continuity equation, Bernoulli's equation
Calorimetry of incompressible fluid, the problem of what heat is.
Basic phenomenology of capillary and osmotic phenomena
History of the discovery of molecules by chemists.
Mol, Avogadro's constant, typical dimensions of the microworld
Phenomenology of gas processes, equation of state, Kelvin scale
Kinetic theory of gas pressure, energy temperature relation

Macroscopic work of gas, heat as microscopic work, first law of thermodynamic
Mayer's relation, Adiabatic process
Data processing elements, arithmetic mean error
Data fitting, minimizing sum of squares, (chi-square distribution?).
Drunken sailor, related to fluctuations
Maxwell's velocity distribution
Boltzmann distribution and barometric formula
Elements of relativity theory

Recommended literature:

Physics part 1. Mechanics: University textbook of general physics / David Halliday, Robert Resnick, Jearl Walker; translated by Jana Musilová ... [et al.]. Brno: VUTIUM Technical University, 2000

Physics part 2. Mechanics - thermodynamics: University textbook of general physics / David Halliday, Robert Resnick, Jearl Walker; translated by Jan Obdržálek ... [et al.]. Brno: VUTIUM Technical University, 2000

General physics: 1: mechanics and molecular physics / Štefan Veis, Ján Maďar, Viktor Martišovitš. Bratislava: Alfa, 1978

Physics for students at technical universities: 1: mechanics, acoustics, thermals / Dionýz Ilkovič. Bratislava: Alfa, 1972

Electronic texts and presentations on the subject's website

Languages necessary to complete the course:

Notes:

Past grade distribution

Total number of evaluated students: 286

A	B	C	D	E	FX
30,77	18,18	13,99	10,84	16,08	10,14

Lecturers: doc. RNDr. Martin Mojžiš, PhD., Mgr. Peter Maták, PhD.

Last change: 18.05.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTF/1-FYZ-413/15	Methods of Solving Physics Problems (1)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 4.

Educational level: I.

Prerequisites:

Course requirements:
Work during semester: homework and problem solution in the class.
Weight of the exam: 0%.
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
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.

Class syllabus:
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.
In the first installment of this class we look at topics from the first three semesters.

Recommended literature:
Feynmanovy přednášky z fyziky s řešenými příklady 1/3 / Richard P. Feynman, Robert B. Leighton, Matthew Sands. Havlíčkův Brod : Fragment, 2001
Feynmanovy přednášky z fyziky s řešenými příklady : 2/3 / Richard P. Feynman, Robert B. Leighton, Matthew Sands. Havlíčkův Brod : Fragment, 2006
Úlohy predchádzajúcich ročníkov fyzikálnych súťaží.

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 96

A	B	C	D	E	FX
97,92	1,04	1,04	0,0	0,0	0,0

Lecturers: doc. Mgr. Juraj Tekel, PhD.

Last change: 18.05.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTF/1-FYZ-414/15	Methods of Solving Physics Problems (2)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 5.

Educational level: I.

Prerequisites:

Course requirements:
Work during semester: homework and problem solution in the class
Weight of the exam: 0%.
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
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.

Class syllabus:
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.

Recommended literature:
Feynmanovy přednášky z fyziky s řešenými příklady 1/3 / Richard P. Feynman, Robert B. Leighton, Matthew Sands. Havlíčkův Brod : Fragment, 2001
Feynmanovy přednášky z fyziky s řešenými příklady : 2/3 / Richard P. Feynman, Robert B. Leighton, Matthew Sands. Havlíčkův Brod : Fragment, 2006
Problems from various physics exams and competitions.

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 33

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

Lecturers: doc. Mgr. Juraj Tekel, PhD.

Last change: 18.05.2022
Approved by: doc. RNDr. Tomáš Blažek, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB/1-FYZ-601/15	Nuclear Physics

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 4 / 2 **per level/semester:** 52 / 26
Form of the course: on-site learning

Number of credits: 7

Recommended semester: 5.

Educational level: I.

Prerequisites:

Course requirements:
Evaluation during the semester: midterm test
Final evaluation: oral exam
Scale for final grades: A 90%, B 80%, C 70%, D 60%, E 50%

Learning outcomes:
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.

Class syllabus:
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.
Radioactivity in nature. Basic nuclear reactions. Production of unstable radioactive isotopes and their separation. Particle accelerator.
Elementary particles (leptons, quarks, interactions, unification theory). Quark model, QCD.
Basic astrophysical reactions. Nuclear fusion.

Recommended literature:
Introductory nuclear physics / Kenneth S. Krane. Hoboken : Wiley, 1988
Introductory nuclear physics / P. E. Hodgson, E. Gadioli, E. Gadioli Erba. Oxford : Oxford University Press, 1997
Nuclear and particle physics / B. R. Martin. Chichester : John Wiley , 2006

Languages necessary to complete the course:

Notes:

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTF/1-FYZ-226/22	Numerical mathematics for physicists

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 3.

Educational level: I.

Prerequisites:

Course requirements:
Continuous assessment: numerical solution of assigned homework
Exam: written
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Credits will be awarded if the student obtains at least 50% points.
Scale of assessment (preliminary/final): Weight of the intermediate / final evaluation: 100/0

Learning outcomes:
Students are able to create programs for numerical solution of selected physical problems.

Class syllabus:
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.

Recommended literature:
Recommended literature:
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;
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;

Languages necessary to complete the course:
Slovak and English

Notes:

At least basic knowledge of programming in the programming language chosen by the student is assumed.

Past grade distribution
Total number of evaluated students: 20

A	B	C	D	E	FX
55,0	10,0	15,0	5,0	5,0	10,0

Lecturers: RNDr. Eduard Masár, PhD.

Last change: 17.10.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/1-FYZ-218/22	Optics

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 3 / 1 **per level/semester:** 39 / 13
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 4.

Educational level: I.

Prerequisites:

Course requirements:
Continuous assessment: test
Exam: oral, written
Indicative rating scale: A 90%, B 80%, C 70%, D 60%, E 50%.
Credits will be awarded if the student obtains at least 50% points.
Scale of assessment (preliminary/final): 40/60

Learning outcomes:
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.

Class syllabus:
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.

Recommended literature:
Svetlo : Vlny, lúče, fotóny / A.Štrba, V.Mesároš, D. Senderáková. Nitra : Enigma, 2011
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 VUTIUM, 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

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAI/2-MXX-132/23	Participation in Empirical Research

Educational activities:
Type of activities: course
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2., 4., 6.

Educational level: I., I.II., II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 202

A	B	C	D	E	FX
89,6	1,49	1,49	0,0	2,97	4,46

Lecturers: Mgr. Xenia Daniela Poslon, PhD.

Last change: 06.09.2023

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAI/2-MXX-132/23	Participation in Empirical Research

Educational activities:
Type of activities: course
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1., 3., 5.

Educational level: I., I.II., II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 202

A	B	C	D	E	FX
89,6	1,49	1,49	0,0	2,97	4,46

Lecturers: Mgr. Xenia Daniela Poslon, PhD.

Last change: 06.09.2023

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTV/1-MXX-110/00	Physical Education and Sport (1)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 0

Recommended semester: 1.

Educational level: I., I.II.

Prerequisites:

Course requirements:
Grades: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
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.

Class syllabus:
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.

Recommended literature:

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 7493

A	B	C	D	E	FX
92,81	1,52	0,23	0,0	0,08	5,37

Lecturers: Mgr. Ladislav Mókus, PaedDr. Dana Mašlejová, 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
Last change: 16.06.2022
Approved by: doc. RNDr. Tomáš Blažek, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTV/1-MXX-120/22	Physical Education and Sport (2)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 1

Recommended semester: 2.

Educational level: I., I.II.

Prerequisites:

Course requirements:
Grades: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
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.

Class syllabus:
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.

Recommended literature:

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 5850

A	B	C	D	E	FX
95,61	1,5	0,14	0,09	0,05	2,62

Lecturers: Mgr. Tomáš Kuchár, PhD., PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, Mgr. Jana Leginusová, PaedDr. Mikuláš Ortutay, Mgr. Martin Dovičák, PhD., Mgr. Júlia Raábová, PhD.,

Mgr. Branislav Nedbálek, PhD., Mgr. Tomáš Lovecký, Mgr. Martina Maheľová, PaedDr. Lucia Ondrušová
Last change: 15.03.2022
Approved by: doc. RNDr. Tomáš Blažek, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTV/1-MXX-210/00	Physical Education and Sport (3)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 3.

Educational level: I., I.II.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:

Class syllabus:
To practise game combinations, tactical - mechanical elements in basketball, volleyball, soccer, floorball, ice hockey, badminton, competition rules in the sports specialization.

Recommended literature:

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 3440

A	B	C	D	E	FX
98,14	0,44	0,09	0,03	0,0	1,31

Lecturers: 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

Last change: 16.06.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTV/1-MXX-220/00	Physical Education and Sport (4)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 4.

Educational level: I., I.II.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:

Class syllabus:
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.

Recommended literature:

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 2957

A	B	C	D	E	FX
97,94	0,17	0,1	0,03	0,0	1,76

Lecturers: 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

Last change: 15.03.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTV/1-MXX-310/00	Physical Education and Sport (5)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 5.

Educational level: I., I.II.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:

Class syllabus:
Preparation and participation of individuals and teams in the system of university sport competitions and sport events.

Recommended literature:

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 2264

A	B	C	D	E	FX
98,63	0,35	0,09	0,0	0,0	0,93

Lecturers: 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

Last change: 15.03.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTV/1-MXX-320/22	Physical Education and Sport (6)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 1

Recommended semester: 6.

Educational level: I., I.II.

Prerequisites:

Antirequisites: FMFI.KTV/1-MXX-320/00

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:

Class syllabus:
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.

Recommended literature:

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 205

A	B	C	D	E	FX
94,63	0,49	0,49	0,0	0,0	4,39

Lecturers: 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

Last change: 15.03.2022

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

STATE EXAM DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KJFB/1-FYZ-951/15	**Course title:** Physics
Number of credits: 4	
Educational level: I.	
Course requirements: Exam: State exam Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 0/100	
Learning outcomes: Passing the state exam	
Class syllabus: State exam consisting of two blocks: 1. Block of classical physics (mechanics, electromagnetism, optics) 2. Block of quantum physics (quantum theory, statistical physics of thermodynamics) A detailed syllabus is on the faculty website.	
State exam syllabus:	
Languages necessary to complete the course: Slovak, English	
Last change: 18.05.2022	
Approved by: doc. RNDr. Tomáš Blažek, PhD.	

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/1-FYZ-477/19	Physics of the Planet Earth

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 4 / 2 **per level/semester:** 52 / 26
Form of the course: on-site learning

Number of credits: 7

Recommended semester: 5.

Educational level: I.

Prerequisites:

Antirequisites: FMFI.KAFZM+KAMŠ/1-FYZ-476/15

Course requirements:
Continuous assessment based on discussions.
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
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).

Class syllabus:
1. How the Earth originated and what is its internal structure.
2. Tides and dynamics of Earth-Moon coexistence.
3. Seismic waves and the most precise physical model of the Earth.
4. Why has the Earth its magnetic field? What will be the magnetic field in future like?
5. Electric currents in the Earth and its surroundings. Electromagnetic sounding of the Earth.
6. Measurements of physical parameters - from archeologic findings to the deep Earth's interior.
7. Excursion
8. Earthquakes, tsunami and seismic hazard.
9. Earthquakes induced by human activity and the increase of seismic hazard.
10. Aurora, ionosphere and magnetosphere of the Earth and planets.
11. Electromagnetic rezonances in the Earth's atmosphere.
12. Sources of heat and heat flux in the Earth. Is the Earth going to overheat or is it growing cold?

Recommended literature:
Lectures.

Languages necessary to complete the course:
Slovak

Notes:

Past grade distribution
Total number of evaluated students: 13

A	B	C	D	E	FX
53,85	7,69	15,38	15,38	0,0	7,69

Lecturers: prof. RNDr. Peter Moczo, DrSc., RNDr. Adriena Ondrášková, PhD., doc. RNDr. Sebastián Ševčík, CSc., doc. Mgr. Jozef Kristek, DrSc., MSc. Jaroslav Valovčan, PhD.

Last change: 08.03.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB/1-FYZ-322/22	Practical in atomic and nuclear physics

Educational activities:
Type of activities: laboratory practicals / independent work
Number of hours:
per week: 2 / 1 **per level/semester:** 26 / 13
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 6.

Educational level: I., I.II.

Prerequisites:

Recommended prerequisites:
1-FYZ-231/22 Introduction to Modern Physics (Physics 2/S)

Course requirements:
Interim evaluation: elaboration of exercise protocols
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
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.

Class syllabus:
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
- 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)
- from nuclear physics: statistical nature of nuclear transformations, determination of gamma radiation energy (principles of scintillation detectors), verification of Compton scattering
- from applied nuclear physics: measurement of air radioactivity (principles of Geiger-Müller detectors).

Recommended literature:
- instructions for exercises at http://www.dnp.fmph.uniba.sk/~kollar/navodnik.htm
- Physics practicum IV: Atomic physics and ionizing radiation detection / Matej Florek ... [et al.]. Bratislava: Comenius University, 1988

Languages necessary to complete the course:
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

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/1-FYZ-222/22	Practical in electricity and magnetism

Educational activities:
Type of activities: laboratory practicals / independent work
Number of hours:
per week: 2 / 1 **per level/semester:** 26 / 13
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 4.

Educational level: I., I.II.

Prerequisites: FMFI.KEF/1-FYZ-217/22 - Electromagnetism or FMFI.KEF/1-TEF-204/22 - Electricity and Magnetism

Course requirements:
Interim evaluation: elaboration of practical papers,
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
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.

Class syllabus:
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 / m0).

Recommended literature:
- e-learning systém k predmetu s aktualizovanými podkladmi k experimentom
- Fyzikálne praktikum II : Návody na praktické cvičenia z elektriny a magnetizmu / Ján Pavlík. Bratislava : Univerzita Komenského, 2002
- Elektromagnetizmus, Andrej Tirpák, Bratislava: Polygrafia SAV, 1999

Languages necessary to complete the course:
Slovak, English (designations of instrument controls and their manuals)

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: 86

A	B	C	D	E	FX
60,47	26,74	3,49	2,33	2,33	4,65

Lecturers: doc. RNDr. Tomáš Roch, Dr. techn., Mgr. Branislav Grančič, PhD., Ing. Pavol Ďurina, PhD., doc. RNDr. Juraj Országh, PhD., Mgr. Leonid Satrapinskyy, PhD., Mgr. Ľubomír Staňo, PhD., Mgr. Veronika Hidaši Turiničová, PhD.

Last change: 21.06.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/1-FYZ-221/22	Practical in mechanics and molecular physics

Educational activities:
Type of activities: laboratory practicals / independent work
Number of hours:
per week: 2 / 1 **per level/semester:** 26 / 13
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 3.

Educational level: I.

Prerequisites:

Course requirements:
Continuous assessment: control of preparation for the internship, elaboration of reports from internships
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): Weight of the intermediate / final evaluation: 100/0

Learning outcomes:
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.

Class syllabus:
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,…).
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.
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.

Recommended literature:

Practicum in Mechanics and Molecular Physics / Nadežda Zrubáková, Elena Brežná, Božena Pisoňová. Bratislava: Comenius University, 2003
Practicum in Mechanics and Molecular Physics / Nadežda Zrubáková, Elena Brežná, Božena Pisoňová. Bratislava: Comenius University, 1999

Languages necessary to complete the course:
Slovak and 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: 119

A	B	C	D	E	FX
63,87	15,13	9,24	2,52	0,84	8,4

Lecturers: doc. RNDr. Juraj Országh, PhD., doc. RNDr. Veronika Medvecká, PhD., RNDr. Ladislav Moravský, PhD., doc. RNDr. Anna Zahoranová, PhD., doc. Mgr. Dušan Kováčik, PhD.

Last change: 22.02.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/1-FYZ-321/22	Practical in optics

Educational activities:
Type of activities: laboratory practicals / independent work
Number of hours:
per week: 2 / 1 **per level/semester:** 26 / 13
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 5.

Educational level: I., I.II.

Prerequisites:

Recommended prerequisites:
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)
or 1-FYZ-211/17 Electromagnetism and Optics (Physics 2/W)

Course requirements:
Interim evaluation: elaboration of practical papers
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Physical interpretation and written / graphic presentation of processed results.

Class syllabus:
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.
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.
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

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.

Recommended literature:
- Web = instructions for the subject with updated data for experiments
- Pavel Vojtek: Practical exercises in optics, MFF UK, 1992, scripts
- Štrba A., Mesároš V., Senderáková D .: Optics with Examples, MFF UK, 1996, scripts

Languages necessary to complete the course:
Slovak, English (designations of instrument controls and their manuals)

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: 63

A	B	C	D	E	FX
76,19	22,22	1,59	0,0	0,0	0,0

Lecturers: RNDr. Ján Greguš, PhD., Mgr. Michaela Horňáčková, PhD., RNDr. Pavel Vojtek, CSc., RNDr. Zuzana Zábudlá, Mgr. Branislav Grančič, PhD.

Last change: 22.02.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTF/1-FYZ-310/15	Quantum Theory (1)

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 4 / 2 **per level/semester:** 52 / 26
Form of the course: on-site learning

Number of credits: 7

Recommended semester: 5.

Educational level: I.

Prerequisites:

Recommended prerequisites:
1-FYZ-231/22 Úvod do modernej fyziky
(Introduction to Modern Physics Course)

Course requirements:
Grades obtained during the semester are based on solutions to 10 or 11 homework problem sets and midterm exam
Final Exam: written exam
Marks: A 70%+ max grade, B 60%+ max grade, C 50%+ max grade, D 40%+ max grade, E 33% + max grade
Scale of assessment (preliminary/final): 40/60

Learning outcomes:
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.

Class syllabus:
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.
Basic concepts of elementary quantum mechanics: wave function and operators.
Wave function and mathematical description of a double-slit experiment with electrons. The principle of superposition.
Measurement in quantum mechanics.
Particle in an infinite well. Physical significance and properties of the wave function.
Free particle. Wave packets based on the principle of superposition to describe a free particle.
Time-dependent and time-independent Schrodinger equations. Stationary states.
Linear and Hermitian operators acting on the space of wave functions.
Properties of Hermitian operators. Operators corresponding to simple

physical quantities known from classical physics. Commutator and its significance.
Derivation of the uncertainty principle.
Time evolution of the general wave function and time evolution of the mean values of physical quantities.
Exact derivation of bound state solutions of simple quantum systems and their properties.
The final potential well and its graphical solution.
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.
Angular momentum: eigenvalues and eigenfunctions. Properties of spherical harmonics.
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.
Spin.
Stern-Gerlach experiment. Orbital vs. spin angular momentum of the electron.
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.
Pauli matrices and their properties, their eigenvalues and eigenvectors.
Spin precession in an external homogeneous magnetic field.
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.

Recommended literature:
Úvod do kvantovej mechaniky / Ján Pišút, Ladislav Gomolčák, Vladimír Černý. Bratislava : Alfa, 1983
Zbierka úloh z kvantovej mechaniky / Ján Pišút, Vladimír Černý, Peter Prešnajder. Bratislava : Alfa, 1985 (No English translations exist.)
D.J.Griffiths: Introduction to Quantum Mechanics, 2ed, Pearson Education Inc, 2005

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 300

A	B	C	D	E	FX
21,0	9,67	11,33	20,0	26,67	11,33

Lecturers: doc. RNDr. Tomáš Blažek, PhD.

Last change: 10.03.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTF/1-FYZ-365/15	Quantum Theory (2)

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 4 / 2 **per level/semester:** 52 / 26
Form of the course: on-site learning

Number of credits: 7

Recommended semester: 6.

Educational level: I.

Prerequisites:

Recommended prerequisites:
1-FYZ-310 Kvantová teória (1)

Course requirements:
Continuous assesment: homework problem sets, exam
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
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.

Class syllabus:
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).

Recommended literature:
Úvod do kvantovej mechaniky / Ján Pišút, Ladislav Gomolčák, Vladimír Černý. Bratislava : Alfa, 1983
Zbierka úloh z kvantovej mechaniky / Ján Pišút, Vladimír Černý, Peter Prešnajder. Bratislava : Alfa, 1985
D.J.Griffiths: Introduction to Quantum Mechanics, 2ed, Pearson Education Inc, 2005

Languages necessary to complete the course:
Slovak, English

Notes:

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-161/00	Russian Language (1)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: I., I.II., II.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Basic communication in Russian, developing other Russian language skills - listening comprehension, reading and writing.

Class syllabus:
To master the fundamentals of general Russian. The language level is A1.
Learning the Cyrillic (Russian) alphabet, gaining basic language competence, building up skills and confidence in dealing with unfamiliar authentic and semi-authentic texts.
The subject provides a course in Russian language for beginners.

Recommended literature:
The textbook: : Точка Ру A1 (Ольга Долматова, Екатерина Новачац), pracovné karty Падежи 1 (Л.С. Безкоровайная, В.Е. Штыленко).

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 746

A	B	C	D	E	FX
57,77	16,62	11,13	4,16	1,74	8,58

Lecturers: Viktoria Mirsalova

Last change: 20.06.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-162/00	Russian Language (2)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2.

Educational level: I., I.II., II.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Basic communication in Russian, developing other Russian language skills - listening comprehension, reading and writing.

Class syllabus:
To master the fundamentals of general Russian.
Learning the Cyrillic (Russian) alphabet, gaining basic language competence, building up skills and confidence in dealing with unfamiliar authentic and semi-authentic texts.
The subject continues the program of Russian language (1) and provides a course of Russian for beginners.

Recommended literature:
Textbook: Точка Ру A1 (Ольга Долматова, Екатерина Новачац), pracovné karty Падежи 1 (Л.С. Безкоровайная, В.Е. Штыленко).

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 435

A	B	C	D	E	FX
63,91	16,09	8,97	3,91	0,92	6,21

Lecturers: Viktoria Mirsalova

Last change: 20.06.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-261/00	Russian Language (3)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 3.

Educational level: I., I.II., II.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Basic communication in Russian, developing other Russian language skills - listening comprehension, reading and writing.

Class syllabus:
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.
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.

Recommended literature:
Точка Ру A2 (Ольга Долматова, Екатерина Новачац) a Short Stories in Russian (Olly Richards, Alex Rowlings)

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 215

A	B	C	D	E	FX
68,84	17,67	9,3	2,33	0,0	1,86

Lecturers: Viktoria Mirsalova

Last change: 20.06.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-262/00	Russian Language (4)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 4.

Educational level: I., I.II., II.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
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.

Class syllabus:
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.
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.

Recommended literature:
Точка Ру A2 (Ольга Долматова, Екатерина Новачац) a Short Stories in Russian (Olly Richards, Alex Rowlings)

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 153

A	B	C	D	E	FX
74,51	14,38	7,19	2,61	0,65	0,65

Lecturers: Viktoria Mirsalova

Last change: 20.06.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAI/2-IKVa-192/19	Science, Technology and Humanity: Opportunities and Risks

Educational activities:
Type of activities: seminar
Number of hours:
per week: 3 **per level/semester:** 39
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 2.

Educational level: I., I.II., II.

Prerequisites:

Course requirements:
Semestral evaluation: active participation
Final evaluation: essay
Weight of the final evaluation: 60%
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.

Learning outcomes:
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.

Class syllabus:
Big data: privacy, politics and power,
Internet of things, it usefulness and threats,
Assistant AI and its place in future society,
Job market and inequality,
Enhancements and human rights and the right to change self and others,
Initiatives for responsible research,
Artificial minds,
Hybridization between species and between AI and organic minds,
Future of minds and trans-humanism,
Artificial emotional intelligence,
An after human era.

Recommended literature:
- S. Russell: Human compatible. Artificial intelligence and the problem of control. Viking, 2019.
- J. Havens: Heartificial intelligence. Embracing our humanity to maximize machines. Penguin, 2016.
- P. Boddington: Towards a code of ethics for artificial intelligence. Springer, 2017.
- 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

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTF/2-FTF-136/17	Selected Topics in Theory of Relativity

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 5.

Educational level: I., II.

Prerequisites:

Course requirements:
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.
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
After completing the course, the student should understand in detail the basic concepts of the special theory of relativity.

Class syllabus:
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;

Recommended literature:
Special Relativity (Springer Undergraduate Mathematics Series) / Nicholas.M.J.Woodhouse, Springer-Verlag Berlin Heidelberg 1992;
Dynamics and relativity (University of Cambridge Part IA Mathematical Tripos), David Tong 2013;

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 67

A	B	C	D	E	FX
47,76	17,91	14,93	16,42	0,0	2,99

Lecturers: Mgr. Peter Maták, PhD.

Last change: 18.05.2022
Approved by: doc. RNDr. Tomáš Blažek, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/1-FYZ-121/22	Seminar from Physics (1)

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 3.

Educational level: I.

Prerequisites:

Course requirements:
Interim evaluation: presentation
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): Weight of the intermediate / final evaluation: 100/0

Learning outcomes:
The student will learn to study independently and then reference a selected topic from contemporary physics.

Class syllabus:
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.

Recommended literature:
articles according to the specification of the submitter of the topic

Languages necessary to complete the course:
Slovak / English (study literature in Slovak or English)

Notes:

Past grade distribution
Total number of evaluated students: 42

A	B	C	D	E	FX
85,71	0,0	0,0	0,0	0,0	14,29

Lecturers: doc. Mgr. Jozef Kristek, DrSc.

Last change: 24.02.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/1-FYZ-220/22	Seminar from Physics (2)

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 4.

Educational level: I.

Prerequisites:

Course requirements:
Interim evaluation: presentation
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): Weight of the intermediate / final evaluation: 100/0

Learning outcomes:
The student will learn to study independently and then reference a selected topic from contemporary physics.

Class syllabus:
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.
The work and presentation are in English.
Topics will be proposed by employees and doctoral students of physics departments, or from the SAS.

Recommended literature:
articles according to the specification of the submitter of the topic

Languages necessary to complete the course:
Slovak / English (study literature in Slovak or English)

Notes:

Past grade distribution
Total number of evaluated students: 20

A	B	C	D	E	FX
85,0	5,0	0,0	0,0	0,0	10,0

Lecturers: doc. Mgr. Jozef Kristek, DrSc.

Last change: 22.02.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-171/20	Slovak Language for Foreign Students (1)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: I., I.II., II., III.

Prerequisites:

Course requirements:
tests
Course prerequisites:
https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
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.

Class syllabus:
The sylabus is targeted at the comprehension of the basics of the Slovak language for the absolute beginners (A1).

Recommended literature:
Krížom- Krážom Slovenčina 1, additional material to further support the covered topics.

Languages necessary to complete the course:

Notes:

Past grade distribution
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

Lecturers: Mgr. Aneta Barnes

Last change: 21.06.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-172/20	Slovak Language for Foreign Students (2)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2.

Educational level: I., I.II., II., III.

Prerequisites:

Course requirements:
tests
Course prerequisites:
https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
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.

Class syllabus:
The sylabus 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.

Recommended literature:
Krížom- Krážom Slovenčina 1, additional material to further support the covered topics

Languages necessary to complete the course:

Notes:

Past grade distribution
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

Lecturers: Mgr. Aneta Barnes

Last change: 21.06.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-271/20	Slovak Language for Foreign Students (3)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 3.

Educational level: I., I.II., II., III.

Prerequisites:

Course requirements:
tests
Course prerequisites:
https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
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.

Class syllabus:
The sylabus 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.

Recommended literature:
Krížom-Krážom Slovenčina 2, additional material to further support the covered topics.

Languages necessary to complete the course:

Notes:

Past grade distribution
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

Lecturers: Mgr. Aneta Barnes

Last change: 21.06.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-272/20	Slovak Language for Foreign Students (4)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 4.

Educational level: I., I.II., II., III.

Prerequisites:

Course requirements:
tests
Course prerequisites:
https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
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.

Class syllabus:
The sylabus 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.

Recommended literature:
Krížom-Krážom Slovenčina 2, additional material to further support the covered topics.

Languages necessary to complete the course:

Notes:

Past grade distribution
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

Lecturers: Mgr. Aneta Barnes

Last change: 21.06.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTV/1-MXX-115/15	Sports in Nature (1)

Educational activities:
Type of activities:
Number of hours:
per week: **per level/semester:**
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: I., I.II.

Prerequisites:

Course requirements:
Grades: A 90%, B 80%, C 70%, D 60%, E 50%.
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.

Learning outcomes:
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.

Class syllabus:
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.

Recommended literature:

Languages necessary to complete the course:
Slovak

Notes:
KTVŠ does not rent ski equipment.

Past grade distribution
Total number of evaluated students: 310

A	B	C	D	E	FX
99,03	0,32	0,32	0,0	0,0	0,32

Lecturers: 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

Last change: 16.06.2022
Approved by: doc. RNDr. Tomáš Blažek, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTV/1-MXX-215/15	Sports in Nature (2)

Educational activities:
Type of activities:
Number of hours:
per week: **per level/semester:**
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2.

Educational level: I., I.II.

Prerequisites:

Course requirements:
Grades: A 90%, B 80%, C 70%, D 60%, E 50%
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.

Learning outcomes:
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.

Class syllabus:
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.

Recommended literature:

Languages necessary to complete the course:
Slovak

Notes:
KTVŠ will provide sports equipment.

Past grade distribution
Total number of evaluated students: 298

A	B	C	D	E	FX
92,62	0,0	0,0	0,0	0,34	7,05

Lecturers: 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
Last change: 16.06.2022
Approved by: doc. RNDr. Tomáš Blažek, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTV/1-MXX-216/18	Sports in Nature (3)

Educational activities:
Type of activities:
Number of hours:
per week: **per level/semester:**
Form of the course: on-site learning

Number of credits: 1

Recommended semester: 3.

Educational level: I., I.II.

Prerequisites:

Antirequisites: FMFI.KTV/1-UXX-151/22

Course requirements:
Grades: A 90%, B 80%, C 70%, D 60%, E 50%
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.

Learning outcomes:
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.

Class syllabus:
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.

Recommended literature:

Languages necessary to complete the course:
Slovak

Notes:
KTVŠ does not rent ski equipment.

Past grade distribution
Total number of evaluated students: 58

A	B	C	D	E	FX
98,28	0,0	0,0	0,0	0,0	1,72

Lecturers: 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
Last change: 16.06.2022
Approved by: doc. RNDr. Tomáš Blažek, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTV/1-MXX-217/18	Sports in Nature (4)

Educational activities:
Type of activities:
Number of hours:
per week: **per level/semester:**
Form of the course: on-site learning

Number of credits: 1

Recommended semester: 4.

Educational level: I., I.II.

Prerequisites:

Antirequisites: FMFI.KTV/1-UXX-152/22

Course requirements:
Grades: A 90%, B 80%, C 70%, D 60%, E 50%
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.

Learning outcomes:
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.

Class syllabus:
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.

Recommended literature:

Languages necessary to complete the course:
Slovak

Notes:
KTVŠ will provide material equipment.

Past grade distribution
Total number of evaluated students: 41

A	B	C	D	E	FX
90,24	0,0	0,0	0,0	0,0	9,76

Lecturers: 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
Last change: 16.06.2022
Approved by: doc. RNDr. Tomáš Blažek, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/1-FYZ-315/15	Statistical Physics and Thermodynamics

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 4 / 2 **per level/semester:** 52 / 26
Form of the course: on-site learning

Number of credits: 7

Recommended semester: 5.

Educational level: I.

Prerequisites:

Course requirements:
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 20/80

Learning outcomes:
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.

Class syllabus:
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.

Recommended literature:
Fundamentals of statistical and thermal physics / Federick Reif. Singapore : McGraw-Hill, [1965]

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 252

A	B	C	D	E	FX
30,95	11,51	15,08	10,71	26,98	4,76

Lecturers: doc. RNDr. Richard Hlubina, DrSc.

Last change: 18.05.2022

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-133/18	Supplementary English Course (1)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: I., I.II.

Prerequisites:

Course requirements:
tests, homework
Scale of assessment (preliminary/final): 100/0 credit - ongoing evaluationMinimum 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:https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/

Learning outcomes:

Class syllabus:
Texts dealing with the most important topics for FMPI majors combining grammar revision with vocabulary needed to pass the A4 English exam.

Recommended literature:
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

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 72

A	B	C	D	E	FX
52,78	19,44	6,94	4,17	4,17	12,5

Lecturers: Mgr. Ing. Jana Kočvarová

Last change: 11.04.2024
Approved by: doc. RNDr. Tomáš Blažek, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-134/18	Supplementary English Course (2)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2.

Educational level: I., I.II.

Prerequisites:

Course requirements:
tests, homework
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:https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/

Learning outcomes:

Class syllabus:
Texts dealing with the most important topics for FMPI majors combining grammar revision with vocabulary needed to pass the A4 English exam.

Recommended literature:
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

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 72

A	B	C	D	E	FX
54,17	13,89	4,17	8,33	5,56	13,89

Lecturers: Mgr. Ing. Jana Kočvarová

Last change: 11.04.2024

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTF/1-FYZ-251/15	Theoretical Mechanics

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 4 / 2 **per level/semester:** 52 / 26
Form of the course: on-site learning

Number of credits: 7

Recommended semester: 3.

Educational level: I.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 20/80

Learning outcomes:
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.

Class syllabus:
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.

Recommended literature:
Theoretical mechanics / Miroslav Brdička, Arnošt Hladík. Prague: Academia, 1987
Mechanics in Physics / Jan Horský, Jan Novotný, Milan Štefaník. Prague: Academia, 2001
Fecko, M .: Extended Syllabus and Problems in Theoretical Mechanics [40 pages, available electronically
J.Langer, J.Podolský: Theoretical Mechanics, electronically at http://utf.mff.cuni.cz/vyuka/OFY003/
J.Tillich, L.Richterek: Classical Mechanics, electronically at http://muj.optol.cz/richterek/lib/exe/fetch.php?media=mechanika:mechanika.pdf

Languages necessary to complete the course:
Slovak, English

Notes:

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

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTF/1-FYZ-265/22	Theory of the Electromagnetic Field

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 4 / 2 **per level/semester:** 52 / 26
Form of the course: on-site learning

Number of credits: 7

Recommended semester: 4.

Educational level: I.

Prerequisites:

Course requirements:
Continuous assessment: homework, paper
Examination: written, with possible oral part
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 20/80

Learning outcomes:
After completing the course, students should be able to solve Maxwell's equations as partial differential equations in some physically important situations.

Class syllabus:
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

Recommended literature:
Landau, Lev D.; Lifshitz, Evgeny M. (1975). The Classical Theory of Fields. Vol. 2 (4th ed.). Butterworth-Heinemann.

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 205

A	B	C	D	E	FX
33,66	12,2	11,71	11,22	23,41	7,8

Lecturers: doc. RNDr. Martin Mojžiš, PhD.

Last change: 18.05.2022

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