Course descriptions

TABLE OF CONTENTS

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FMK-242/00	Aeronautical Meteorology

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: 4.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
The bases of aeronautical meteorology. The considerable meteorological phenomena in aviation. Air navigation. Services for air transport. Aircraft traffic. Organized meteorological services to aviation on an international standard. Meteorological observations and systems to information distribution on airports. Information on considerable weather. Quality control and records data. Meteorological office activity.

Recommended literature:
Compendium of Meteorology. Vol.II, Part 2-Aeronautical Meteorology, WMO-No.364.
Holton, J.R.: An Introduction to Dynamic Meteorology. Academic Press, London, 1992, 511p.
Predpis L3-Letecká meteorologická služba, Ministerstvo DPT SR, 2001

Languages necessary to complete the course:

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: Mgr. Zuzana Surová, Ing. Sandra Krollová, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FOZ-254/15	Air Pollution Control Technologies

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: II.

Prerequisites:

Course requirements:
Preliminary evaluation:
Final exam: oral / written
Indicative evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 10/90

Learning outcomes:
The student will gain an overview of existing conventional but also experimental technologies used to clean the air from gaseous pollutants and particulate matter.

Class syllabus:
Energy sources, production, demand and consumption. Sources and types of pollutants, their typical concentrations and air quality standards. Oxides of nitrogen (NOx), sulfur (SOx) and carbon (COx), methane (CH4), ozone (O3) and hydrocarbons (HC) - their basic properties and sources. Particulate matter (PM) - history, categorization and mechanisms of formation. Global environmental problems - greenhouse effect, acid rain, photochemical smog. Kyoto Protocol, Paris Climate Agreement and other climate conferences.
Pollutant prevention technologies. Fuel selection, treatment and purification, combustion temperature control, boiler configuration, non-stoichiometric and multi-stage combustion, flue gas recirculation, etc.
Pollutant reduction and removal technologies and their principles. NOx / SOx: adsorption, absorption, selective catalytic reduction (SCR). COx: sequestration, biochar, artificial weathering. CH4: steam and dry reforming. O3: adsorption, thermal and catalytic decomposition. HC: biofiltration, condensation, adsorption, thermal and catalytic oxidation. Particulate matter (PM): gravity settling chambers, cyclones, wet scrubbers, fabric filters, electrostatic precipitators. Mobile sources of pollution: emission standards, parameters affecting emissions, performance and consumption. Three-way and oxidation catalyst and diesel particulate filter (DPF), SCR and AdBlue.
Pollutant removal by electric discharges and hybrid plasma and catalyst systems. Process efficiency, carbon balance, selectivity. Commercial and industrial applications for air purification and deodorization for static and mobile applications.

Recommended literature:

K. Wark: Air pollution - Its origin and control, Addison-Wesley (1998)
K. C. Schifftner: Air pollution control equipment selection guide, Lewis Publishers (2002)
J. Hagen: Industrial catalysis - A practical approach, Wiley (2006)
K. B. Schnelle, et al.: Air pollution control technology handbook, CRC Press (2016)

Languages necessary to complete the course:

Slovak in combination with English (some of the suggested readings are in English)

Notes:

Past grade distribution

Total number of evaluated students: 20

A	B	C	D	E	FX
50,0	35,0	15,0	0,0	0,0	0,0

Lecturers: doc. RNDr. Karol Hensel, PhD.

Last change: 15.03.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FMK-233/15	Air Pollution Modelling

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: 3.

Educational level: 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: 0

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

Lecturers: RNDr. Martin Kremler, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FOZ-212/15	Application Software in Meteorology

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: 4.

Educational level: II.

Prerequisites:

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

Learning outcomes:
Programming and software skill improvements oriented to the meteorology and climatology fields running under the UNIX operating system, LaTex formatting language.

Class syllabus:
Data visualization, GRADS and other software for plotting meteorological and climatological fields. FORTRAN programming language, scripting, programming in UNIX system. Command interpreters, shell. Fortran language concepts, syntax, types of variables - their declaration, operations with variables, fields. Arithmetic expressions, standard – intrinsic functions, logical operations, assignment statement. Formatted description, input-output commands, namelist, unconditional jump statement… Subroutines, functions and subroutines, global variables. Independent creation of short programs.
Programming of physical processes, e.g. advection, vertical stratification of the atmosphere.
Text editors (LA) TEX, software for writing scientific papers. Text processing and manipulation and work with large files.

Recommended literature:
Programovací jazyk FORTRAN 77 a vědeckotechnické výpočty / Jiří Hřebíček. Praha : Academia, 1989
Základy programovania fyzikálnych problémov : (programovací jazyk FORTRAN) / Ľudovít Fischer. Bratislava : Univerzita Komenského, 1982
Operační systém Unix a jazyk C / Jan Brodský, Luděk Skočovský. Praha : Státní nakladatelství technické literatury, 1989
Computational Techniques for Fluid Dynamics, Vol. 1: Fundamental and General Techniques / C. A. Fletcher, Springer 2005, 401 pp.

Languages necessary to complete the course:
Slovak in combination with English (some of the suggested readings are in English).

Notes:

Past grade distribution
Total number of evaluated students: 6

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

Lecturers: doc. RNDr. Martin Gera, PhD.

Last change: 14.03.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FMK-135/15	Applied Climatology

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: 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: 6

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

Lecturers: prof. RNDr. Milan Lapin, CSc.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FMK-112/00	Atmospheric Boundary Layer Physics

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: 2.

Educational level: II.

Prerequisites:

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

Learning outcomes:
The student will gain basic knowledge of the processes taking place in the ground and boundary layers of the atmosphere, which he will be able to use in a number of applications (e.g. air pollution issues, flow modelling).

Class syllabus:
Earth's atmosphere. Turbulent state of the atmosphere, vertical transfer of substances in a turbulent atmosphere, turbulence criteria. Prandtle's theory of turbulent momentum transfer, length of mixing, roughness parameter, turbulent diffusion coefficient. The equation of turbulent diffusion. Vertical distribution of meteorological elements in the ground and boundary layers of the atmosphere. Methods for determining the characteristics of turbulence. Calculation of turbulent heat and water vapour flows in the ground layer of the atmosphere. The theory of the similarity of Monin and Obuchov. Taylor-Ekman spiral. Methods for determining the components of the radiation and energy balance. Determination of evaporation from the surface of soil and plants.

Recommended literature:
Gera, M., Tomlain, J., Damborská, I.: Fyzika hraničnej vrstvy atmosféry. Knižničné a edičné centrum FMFI UK, Bratislava, druhé rozšírené vydanie, 2011, 176 s.
Stull, R.B.: An Introduction to Boundary Layer Meteorology. Springer, 1988, 670 p.
Pope, S.B.: Turbulent Flows. Cambridge University Press, 2000
Arya, P. S.: Introduction to Micrometeorology. Academic Press, 2001

Languages necessary to complete the course:
Slovak in combination with English (some of the suggested readings are in English)

Notes:

Past grade distribution
Total number of evaluated students: 43

A	B	C	D	E	FX
76,74	2,33	16,28	2,33	2,33	0,0

Lecturers: RNDr. Ingrid Damborská, CSc.

Last change: 15.03.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FMK-234/00	Atmospheric Chemistry

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: 3.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
Chemical and photochemical reactions in the atmosphere. Calculation of photodissociation coefficient. Radicals. Homogenous and heterogeneous reactions. Oxidation capacity of the atmosphere. Tropospheric chemistry. Chemistry in clouds. Stratospheric chemistry. Mathematical model of the boundary layer chemistry. Mathematical model of the clouds chemistry. Mathematical model of the stratospheric chemistry.

Recommended literature:
Warneck, P., 1988: Chemistry of the natural atmosphere. Academic Press, San Diego, 758 p.
Závodský, D. – Ďurec, F. – Medveď, M., 2001: Atmospheric chemistry and air pollution modelling. UMB Banská Bystrica, 128 p.
Scientific journals – selected articles.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 4

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

Lecturers: RNDr. Martin Kremler, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FMK-249/00	Atmospheric Convection

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: 4.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
Introduction: Convection and convection dynamics. Scales of convection. Synoptic setting. Methods of research and early warning. Physical parameters, instability indices and their application in diagnostics and forecasting of convective phenomena. Vorticity, helicity and their use by explaining kinematics and dynamics of severe storms. Hails – methods of detection and research. Convective systems, structure and types of convective cells. Downburst. Gust front. Tornado. Atmospheric electricity. Lightning detection and its practical use in monitoring and forecasting the thunderstorm activity.

Recommended literature:
Blustein, H.B.: Synoptic-Dynamic Meteorology in Midlatitudes, Vol I, II. Oxford Univ. Press, 1992, 431 pp.
Cotton, W.R., Anthes, R.A., Storm and Cloud Dynamics, Academic Press, 1989, 881 pp.
Doswell III.C. Microburst – a handbook for visual identification, NOAA/NSSL Norman OK (Report).
Fujita, T.T.: The downburst, The University of Chicago, 1985, 121 pp.
Green, S.I., Fluid Vortices, Kluwer Academic Publishers, 1995
Mac Gorman, D.K., Rust, D.: Electrical Nature of Storms, Oxford Univ. Press, 1998.
Rakov, V.A., Uman, M.A.: Lightning, Physics and Effects, Cambridge University Press, 2003, 687 pp.
Articles from INTERNET and from journals about recent research in convection (Monthly Weather Review, Journal of Atmospheric Sciences).

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 17

A	B	C	D	E	FX
52,94	5,88	17,65	11,76	5,88	5,88

Lecturers: doc. RNDr. Martin Gera, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FMK-244/00	Atmospheric Ozone

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: 4.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
Tropospheric and stratospheric ozone. Natural variability of atmospheric ozone. Ozone monitoring (programs GAW and EMEP). Tropospheric ozone changes. Photochemical smog. Stratospheric ozone depletion. Ozone holes. Danger of stratospheric ozone decline and tropospheric ozone increase. Vienna convention on ozone layer protection. Convention on long-range transboundary air pollution in Europe.

Recommended literature:
Závodský, D. (ed.): Atmospheric chemistry and air pollution modelling. Leonardo da Vinci Programme. UMB Banská Bystrica, 2001, 128 p.
Scientific assessment of ozone depletion - 1998. WMO Ozone Report, Ženeva, 1998.
Scientific assessment of ozone depletion - 2002. WMO Ozone Report, Ženeva, 2002.
Selected scientific articles.

Languages necessary to complete the course:

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: RNDr. Martin Kremler, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB/2-FBF-202/00	Bioenergetics

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

Number of credits: 4

Recommended semester: 1.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
The first and second theorems of thermodynamic and biological systems. Gibbs energy, coupling of chemical reactions. Entropy of open thermodynamic systems. Entropy and information. The meaning of biological arrangement. Biological system, cell, organelles (mitochondria). Macromolecules in bioenergetics. General principles of metabolism. Glycolysis, formation of acetylcoenzyme A, Krebs cycle, electron transport chain complexes in mitochondria and their inhibitors, the relationship between respiration and energy production. Membrane transport. Quantitative bioenergetics, driving force ratio, redox and electrochemical potential, experimental determination of mitochondrial function. Enzymes and kinetics of enzyme processes. Substrate phosphorylation. Membrane phosphorylation - chemical concept. Mitchell's chemiosmotic concept. Conformational concept of membrane phosphorylation. Photosynthesis.

Recommended literature:
Bioenergetics: its thermodynamic foundations / Lars Garby, Poul S. Larsen. Cambridge : Cambridge University Press, 1995. ISBN 10: 0521066352
Bioenergetics 4 / David G. Nicholls, Stuart J. Ferguson. London : Academic Press, 2013. ISBN: 9780123884251
Biological physics : energy, information, life / Philip Nelson ; with the assistance of Marko Radosavljevic and Sarina Bromberg. New York : W. H. Freeman, 2004. ISBN 0-7167-4372-8
Molecular Biology of the Cell / Bruce Alberts et al. W. W. Norton & Company; 6th edition, 2014. ISBN-10: 0815345240

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 47

A	B	C	D	E	FX
82,98	10,64	4,26	0,0	2,13	0,0

Lecturers: doc. RNDr. Iveta Waczulíková, PhD., Mgr. Veronika Šubjaková, PhD.

Last change: 22.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB/2-FJF-238/00	Biological Effects of Ionizing Radiation

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: 4.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
The temporal course of radiation effects. Cellular and subcellular radiobiology. Theories and models for cell survival. Radiation effects of particles with high linear energy transfer (LET, Bragg peak, dependence RBE on LET, direct and indirect action, fractionation of exposure). Late effects of radiation on tissue (stochastic and nonstochastic effects). Radiation biology of normal and neoplastic tissue systems.

Recommended literature:
Alpen E.L.: Radiation Biophysics, Academic Press, San Diego, 1998
Nias A.H.W.: An introduction to radiobiology, Wiley, Chichester, 2000
Alberts B., Bray D., Lewis J., Raff M., Roberts K., Watson J.D.: Molecular Biology of the Cell, Garland Publ., NY 1994

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 10

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

Lecturers: RNDr. Radoslav Böhm, PhD.

Last change: 22.02.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FMK-238/00	Climate Changes and Variability

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: 3.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
Climate changes, climatic variability, climatic cycles, and the "climate change" in the all Earth's history and in the next centuries.
Instrumental and the other observations as the base for the climate changes, variations and variability research. Climatic changes from the Pre-Cambrium up to the year 1000. Climatic changes and variability in the last millennium and in the 20th century. Climate change scenarios for the 21st century (natural and anthropogenically induced climatic changes due to the green-house effect increase). Climate change and change in the ozone concentration. Thermal and other atmospheric pollution, green-house gases and aerosols emission. Climate change and climatic variation forecasts, climate change scenarios (limatic scenarios by the IPCC)

Recommended literature:
Chrgian, A.Ch.: Fizika atmosfery, Tom 1, 2. Gidrometeoizdat, Leningrad 1978, 247 and 319 pp.
Netopil, R. et al.: Fyzická geografie 1. SPN, Praha, 1984, 273 pp.
Frakes, L.A.: Climates Throughout Geologic Time. Elsevier Sci. Publ. Comp., Amsterdam, 1979, 310 pp.
Monin, A.C., Šiškov, A.J.: Istorija klimata. Gidrometeoizdat, Leningrad, 1979, 408 pp. 5.
Peixoto, J.P., Oort, A.H.: Physics of Climate. AIP Press, Springer, New York 1992, 520 pp.;
Lapin, M., Tomlain, J.: Všeobecná a regionálna klimatológia. Vyd. UK Bratislava, Bratislava 2001, 184 pp.;
Pedlosky, J.: Ocean Circulation Theory. Springer, Berlin 1998, 455 pp.;
Dobrovolski, S.G.: Stochastic Climate Theory. Springer, Berlin 2000, 282 pp.
Climate Change 2001: The Scientific Basis. J. T. Houghton, et al. (Eds.). Cambridge Univ. Press, UK, 2001, 944 pp.
The newest information from the INTERNET and journals.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 13

A	B	C	D	E	FX
84,62	15,38	0,0	0,0	0,0	0,0

Lecturers: prof. RNDr. Milan Lapin, CSc.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FMK-110/00	Climate of Central Europe and Slovakia

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: 2.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
Central European climate sub-system, climate forming factors and processes and their interactions. Climatic patterns for selected climatic elements. Climate and its peculiarities in the individual Central European regions. Dynamic climatology. Climatic classifications for Central Europe. Climate and mesoclimate of the atmospheric boundary layer and aeroclimatology. Climatic normals and characteristics of selected Central European cities and in Slovakia at changing climate forming conditions.

Recommended literature:
Lebedeva, A.N., Jegorova, A.Ju.: Klimaty zapadnoj Jevropy. Gidrometeoizdat, Leningrad 1983, 445 pp.
Klimatické pomery na Slovensku. Zborník prác SHMÚ, Vol. 33/I and 33/II, Alfa, Bratislava 1991 and 1990, 239 s. a 34,65 AH.
Okolowicz, W.: General Climatology Polish Sci.Pub., Warszawa 1976, 422 pp.
Netopil, R. et al.: Fyzická geografie 1.SPN Praha 1984, 272 pp.
Podnebí Československa – Souborná studie (Š. Petrovič, ed.), HMÚ Praha, Severografia, Turnov 1969, 357 pp.
Lapin, M., Tomlain, J.: Všeobecná a regionálna klimatológia, Vyd. UK Bratislava, Bratislava 2001, 184 pp.
Klimatické a fenologické pomery jednotlivých krajov Slovenska, HMÚ Praha and SHMÚ Bratislava.
Atlas krajiny Slovenskej republiky (L. Miklós ed.) MŽP SR Bratislava a AŽP Banská Bystrica 2002, 344 pp.
Climatic normals by the WMO for 1961-1990. WMO, Geneva 1992 (on CD).

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 52

A	B	C	D	E	FX
44,23	46,15	1,92	5,77	1,92	0,0

Lecturers: prof. RNDr. Milan Lapin, CSc., RNDr. Marián Melo, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FOZ-152/10	Climatology and Hydrology

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: 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: 13

A	B	C	D	E	FX
76,92	23,08	0,0	0,0	0,0	0,0

Lecturers: prof. RNDr. Milan Lapin, CSc., RNDr. Marián Melo, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB+KAFZM/2-FOZ-275/15	Complex Solutions of Real Environmental Problems

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

Number of credits: 4

Recommended semester: 4.

Educational level: 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: 22

A	B	C	D	E	FX
90,91	9,09	0,0	0,0	0,0	0,0

Lecturers: doc. RNDr. Marcela Morvová, PhD., prof. RNDr. Zdenko Machala, DrSc., RNDr. Marcela Morvová, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FOZ-156/15	Computational Methods in Liquid Dynamics

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: 2.

Educational level: II.

Prerequisites:

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

Learning outcomes:
Application of numerical procedures to solve meteorological and climatological problems.

Class syllabus:
Computer arithmetic, error propagation in calculations, interactive solution of nonlinear equations, interpolation, approximation of functions. Orthogonal Chebyshev and Legendre polynomials, discrete integral approximation, Newton-Cotes method, Gaussian integration. Determination of eigenvalues of selected matrices, diagonalization of matrices, compilation and solution of discrete forms of selected differential equations describing fluid dynamics, Initial value problem, nondimensional equation, solution of integral equations, issues of uniqueness, consistency, stability and thus convergence of the solution, Euler's method of solution diff. equations, Runge-Kutta methods, multistep methods, Predictor-corrector method. The topics are focused to solve problems in meteorology and climatology.

Recommended literature:
Numerické metody matematické analýzy / Petr Přikryl. Praha : Státní nakladatelství technické literatury, 1988
Základy numerické matematiky / Anthony Ralston ; přeložili z anglického originálu Milan Práger, Emil Vitásek. Praha : Academia, 1978
Theoretical Numerical Analysis, A Functional Analysis Framework / Atkinson, Kendall, Han, Weimin, Series: Texts in Applied Mathematics, Vol. 39., 3rd ed., Springer, 2009

Languages necessary to complete the course:
Slovak in combination with English (some of the suggested readings are in English).

Notes:

Past grade distribution
Total number of evaluated students: 9

A	B	C	D	E	FX
33,33	11,11	33,33	11,11	11,11	0,0

Lecturers: doc. RNDr. Martin Gera, PhD.

Last change: 14.03.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB/2-FOZ-141/15	Computer Modelling of Environmental Processes

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: 3.

Educational level: 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: 6

A	B	C	D	E	FX
83,33	16,67	0,0	0,0	0,0	0,0

Lecturers: prof. RNDr. Jozef Masarik, DrSc., Mgr. Róbert Breier, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/2-FTL-204/15	Diagnostic Methods in Solid State Physics

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

Number of credits: 6

Recommended semester: 3.

Educational level: 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: 46

A	B	C	D	E	FX
65,22	28,26	2,17	4,35	0,0	0,0

Lecturers: prof. RNDr. Andrej Plecenik, DrSc., doc. RNDr. Miroslav Zahoran, CSc., doc. Ing. Maroš Gregor, PhD., doc. RNDr. Tomáš Plecenik, PhD., doc. RNDr. Tomáš Roch, Dr. techn., Mgr. Leonid Satrapinskyy, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB/2-FOZ-913/15	Diploma Thesis

Educational activities:
Type of activities: independent work
Number of hours:
per week: 10 **per level/semester:** 130
Form of the course: on-site learning

Number of credits: 10

Recommended semester: 4.

Educational level: 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: 29

A	B	C	D	E	FX
82,76	10,34	3,45	3,45	0,0	0,0

Lecturers:

Last change:

Approved by:

STATE EXAM DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KJFB/2-FOZ-991/15	**Course title:** Diploma Thesis Defence
Number of credits: 4	
Educational level: II.	
State exam syllabus:	
Last change: 02.06.2015	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB/2-FOZ-920/10	Diploma Thesis Seminar (1)

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

Number of credits: 1

Recommended semester: 3.

Educational level: 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: 31

A	B	C	D	E	FX
96,77	3,23	0,0	0,0	0,0	0,0

Lecturers: prof. RNDr. Pavel Povinec, DrSc., prof. RNDr. Ján Urban, DrSc.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB/2-FOZ-921/10	Diploma Thesis Seminar (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: 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: 31

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

Lecturers: prof. RNDr. Pavel Povinec, DrSc., prof. RNDr. Ján Urban, DrSc.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FMK-111/00	Dynamic Forecasting Methods in Meteorology

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

Number of credits: 4

Recommended semester: 2.

Educational level: II.

Prerequisites: FMFI.KAFZM/2-FOZ-107/15 - Physics of Lower Atmospheric Layers

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

Learning outcomes:
Gain knowledge of methods and procedures for the analysis of processes in the atmosphere using dynamic models. Basic schemes of atmospheric model integration are presented.

Class syllabus:
Assimilation cycle, variational analysis, governed equations of motion, Lagrange's equations of motion of the second kind, Lagrange's formalism, spherical coordinate system, map projections, stereographic projection, generalized vertical coordinate, barotropic atmosphere, outline of equation integration. Energy conservation law for generalized vertical coordinate, available potential energy. Atmospheric oscillations, sound waves, surface and internal gravity waves, orographic waves, mixed inertial and gravity waves, Rossby waves

Recommended literature:
An introduction to dynamic meteorology / James R. Holton. New York : Academic Press, 1992
Příručka dynamické meteorologie / František Pechala, Jan Bednář. Praha : Academia, 1991
Dynamics of the atmosphere: a course in theoretical meteorology / Wilford Zdunkowski and Andreas Bott, Cambridge University Press, Cambridge, 2003. No. of Pages: xviii + 719
Computational Techniques for Fluid Dynamics, Vol. 1: Fundamental and General Techniques / C.A. Fletcher, Springer 2005, 401 pp

Languages necessary to complete the course:
Slovak in combination with English (some of the suggested readings are in English).

Notes:

Past grade distribution Total number of evaluated students: 34					
A	B	C	D	E	FX
20,59	17,65	23,53	26,47	8,82	2,94
Lecturers: doc. RNDr. Martin Gera, PhD.					
Last change: 14.03.2022					
Approved by:					

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB/2-FOZ-201/15	Ecology and Radioecology

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: 1.

Educational level: 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: 11

A	B	C	D	E	FX
54,55	18,18	0,0	9,09	0,0	18,18

Lecturers: RNDr. Miroslav Ješkovský, PhD., Ing. Jakub Kaizer, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB/2-FOZ-286/15	Ecosystems and their Interactions

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: 4.

Educational level: 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: 1

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

Lecturers: Mgr. Róbert Breier, PhD., Ing. Jakub Kaizer, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/2-FOZ-109/15	Electric and Optical Properties of Solid Materials

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: 8

Recommended semester: 2.

Educational level: 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: 15

A	B	C	D	E	FX
6,67	20,0	13,33	13,33	40,0	6,67

Lecturers: doc. RNDr. Richard Hlubina, DrSc.

Last change: 24.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAI/2-MXX-130/21	Elements of AI

Educational activities:
Type of activities: independent work
Number of hours:
per week: 25 **per level/semester:** 325
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2.

Educational level: II.

Prerequisites:

Course requirements:
Passing the online course https://course.elementsofai.com/ (in Enlish or Slovak version).

Learning outcomes:
The student will get acquainted with selected basic concepts of artificial intelligence and their use in solving various practical tasks.

Class syllabus:
1. What is artificial intelligence: related areas, AI philosophy.
2. Troubleshooting and UI: Browsing and troubleshooting, browsing and games
3. Probability and chance, Bayes' theorem, naive Bayesian classification.
4. Machine learning: nearest neighbor classifier, regression.
5. Neural networks: basics, creation, modern techniques.
6. Consequences: on predicting the future, the effects of AI on society, summary.

Recommended literature:
Russell S., Norwig P. (2010). Artificial Intelligence: A Modern Approach, (3rd ed.), Prentice Hall. Available in faculty library.
Marsland S. (2015). Machine Learning: An Algorithmic Perspective, (2nd ed.), CRC Press.

Languages necessary to complete the course:
Slovak or English

Notes:
The course consists of 20 numerical and 5 text-based tasks. Numerical tasks are checked automatically, text-based tasks are evaluated anonymously by students.

Past grade distribution
Total number of evaluated students: 37

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

Lecturers: doc. RNDr. Mária Markošová, PhD.

Last change: 22.08.2021
Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAI/2-MXX-130/21	Elements of AI

Educational activities:
Type of activities: independent work
Number of hours:
per week: 25 **per level/semester:** 325
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: II.

Prerequisites:

Course requirements:
Passing the online course https://course.elementsofai.com/ (in Enlish or Slovak version).

Learning outcomes:
The student will get acquainted with selected basic concepts of artificial intelligence and their use in solving various practical tasks.

Class syllabus:
1. What is artificial intelligence: related areas, AI philosophy.
2. Troubleshooting and UI: Browsing and troubleshooting, browsing and games
3. Probability and chance, Bayes' theorem, naive Bayesian classification.
4. Machine learning: nearest neighbor classifier, regression.
5. Neural networks: basics, creation, modern techniques.
6. Consequences: on predicting the future, the effects of AI on society, summary.

Recommended literature:
Russell S., Norwig P. (2010). Artificial Intelligence: A Modern Approach, (3rd ed.), Prentice Hall. Available in faculty library.
Marsland S. (2015). Machine Learning: An Algorithmic Perspective, (2nd ed.), CRC Press.

Languages necessary to complete the course:
Slovak or English

Notes:
The course consists of 20 numerical and 5 text-based tasks. Numerical tasks are checked automatically, text-based tasks are evaluated anonymously by students.

Past grade distribution
Total number of evaluated students: 37

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

Lecturers: doc. RNDr. Mária Markošová, PhD.

Last change: 22.08.2021
Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

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: 1., 3.

Educational level: I., 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: 215

A	B	C	D	E	FX
67,44	13,02	6,51	1,86	1,4	9,77

Lecturers: Mgr. Aneta Barnes

Last change: 21.06.2022
Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

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: 2., 4.

Educational level: I., 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: 146

A	B	C	D	E	FX
77,4	12,33	3,42	1,37	0,0	5,48

Lecturers: Mgr. Aneta Barnes

Last change: 21.06.2022
Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FOZ-102/10	Environmental Geophysics

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: 1.

Educational level: II.

Prerequisites:

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

Learning outcomes:
Students will understand the principles of selected geophysical methods that are used in monitoring and analyzing the state of the environment. In the presentation of methods, emphasis will be placed on the mathematical and physical principles that make up the essence of these methods (seismic, gravimetric, electrical, magnetic, and electromagnetic sounding methods).

Class syllabus:
Tectonic earthquakes, origin of tectonic earthquakes. The basics of the theory of elastic waves, types of seismic waves. Macroseismic intensity. Macroseismic scales. Energy and earthquake size. Magnitude, types of magnitude. Magnitude saturation. Seismograms. Wave content of seismograms for near earthquakes. Earthquake detection. Location of earthquakes. Earthquake activity of the territory of Slovakia. Methods of seismic hazard analysis. Seismic hazard of the territory of Slovakia.
Gravimetry. Gravity anomalies and estimation of rock densities from gravity measurements. Magnetometry. Earth magnetic field - its structure and variations. Magnetic properties of rock samples. Magnetometers. Terrestrial and areal measurements of magnetic field. Geoelectrical methods. Resistivity profiling. Electrochemical methods, method of spontaneous and induced polarisation. Electromagnetic sounding, magnetotelluric methods. Electromagnetic smog.

Recommended literature:
J. Gruntorád a kol.: Principy metod užité geofyziky, Státní nakladatelství technické literatury (1985);
W.M. Telford et al. Applied geophysics. Cambridge University Press. (1990)
L. Reiter: Earthquake hazard analysis. Issues and insights, Columbia University Press (1990)
P. Shearer: Introduction to seismology, Cambridge University Press (1999)

Languages necessary to complete the course:
Slovak in combination with English (some of the suggested readings are in English)

Notes:

Past grade distribution
Total number of evaluated students: 26

A	B	C	D	E	FX
61,54	23,08	11,54	3,85	0,0	0,0

Lecturers: doc. RNDr. Sebastián Ševčík, CSc., RNDr. Róbert Kysel, PhD.

Last change: 12.03.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB/2-FOZ-101/10	Environmental Physics

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: 1.

Educational level: II.

Prerequisites:

Course requirements:
Exam: written and oral exam, successful completion of the written part is condition of the oral part.
Share in overall rating: 80/20.
Indicative rating 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 gain basic information about the current status of the field of environmental physics.

Class syllabus:
Principles of heat conduction and heat conduction equation, heat waves, sudden temperature change, stationary heat conduction in a cylinder and ball plate, without internal heat sources, efficiency of real and ideal heat machines, efficiency of combined cycle systems. Nuclear reactions, nuclear excitation energy, fission mechanism, neutron diffusion, neutron absorption and moderation, reactor. Synthesis and energy, Sulfur pollutants in the environment (modelling of the spread of substances, area continuous source, radon and stability). Environmental compartments and their interaction, Composition and physical properties of the ocean, Vertical stability of the ocean and atmosphere, Transport: Definitions, Transport processes, Advection and diffusion effects, Diffusion of tracers, Fluids in the environment, Mechanical properties of fluids and solids, Lagrange vs. Euler representation, Continuity equation, Equation of motion in fluid dynamics, Forces in fluid media: - Gravity and geopotential, Equation of motion I: Euler, Friction, Geophysical dynamics of fluids: Centrifugal and Coriolis force, Equation of motion II: Navier-Stokes equation, components of Navier-Stokes equation, Analysis of Navier-Stokes equation, Order sizes of parts of Navier-Stokes equation, Concept of vorticity, Unstable solutions of differential equations, Turbulence criteria: Reynolds number, Turbulence and Reynolds number.

Recommended literature:
Principles of environmental physics / John Monteith, Mike Unsworth. Burlington : Academic press, 2008
Climates of the Oceans / H. Van Loon. Amsterdam : Elsevier, 1984

Languages necessary to complete the course:
Slovak in combination with English (some of the suggested readings are in English)

Notes:

Past grade distribution
Total number of evaluated students: 41

A	B	C	D	E	FX
51,22	31,71	7,32	7,32	2,44	0,0

Lecturers: doc. RNDr. Ivan Sýkora, PhD., RNDr. Radoslav Böhm, PhD.

Last change: 16.06.2022

Approved by:

STATE EXAM DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KJFB/2-FOZ-954/15	**Course title:** Environmental Physics and Renewable Energy Sources
Number of credits: 4	
Educational level: II.	
State exam syllabus:	
Last change: 16.01.2019	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB/2-FOZ-118/15	Field Research

Educational activities:
Type of activities: fieldwork
Number of hours:
per week: **per level/semester:** 40s
Form of the course: on-site learning

Number of credits: 4

Recommended semester: 2.

Educational level: 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: 23

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

Lecturers: doc. RNDr. Marcela Morvová, PhD., doc. RNDr. Monika Müllerová, PhD., Mgr. Ivan Kontuľ, PhD., RNDr. Juraj Bartok, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

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., 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: 435

A	B	C	D	E	FX
45,75	20,0	18,85	8,74	2,3	4,37

Lecturers: Mgr. Ľubomíra Kožehubová

Last change: 20.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

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., 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: 265

A	B	C	D	E	FX
38,87	25,28	19,62	10,19	2,64	3,4

Lecturers: Mgr. Ľubomíra Kožehubová

Last change: 20.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

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., 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: 104

A	B	C	D	E	FX
39,42	27,88	21,15	6,73	0,96	3,85

Lecturers: Mgr. Ľubomíra Kožehubová

Last change: 20.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

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., 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: 74

A	B	C	D	E	FX
41,89	32,43	17,57	2,7	1,35	4,05

Lecturers: Mgr. Ľubomíra Kožehubová

Last change: 20.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FMK-109/00	General and Regional Climatology

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

Number of credits: 4

Recommended semester: 1.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
Earth's global climate system, climate forming factors and processes and their interactions. Sources utilized in climatology. Radiative and circulation climate forming factors. Climatic patterns for selected climatic elements. Climate and its peculiarities in the individual Earth's regions. Dynamic climatology. Climatic classifications. Climate characteristics according to principal types of climatic classifications. Climate changes and variability. Anthropogenic impacts on climate. Climate modeling. Climatic scenarios for the 21st century. Climate change impacts.

Recommended literature:
Bluthgen, J., Weischet, W.: Algemeine Klimageographie, 3.Ed., Walt de Gruyter, Berlin 1980, 882 pp.
Chrgian, A.Ch.: Fizika atmosfery, Tom 1 a 2., Gidrometeoizdat, Leningrad 1978, 247 a 319 pp.
Okolowicz, W.: General Climatology Polish Sci.Pub., Warszawa 1976, 422 pp.
Netopil, R. et al.: Fyzická geografie 1. SPN, Praha 1984, 272 pp.
Peixoto, J.P., Oort, A.H.: Physics of Climate. AIP Press, Springer, New York 1992, 520 pp.;
Lapin, M., Tomlain, J.: Všeobecná a regionálna klimatológia. Vyd. UK Bratislava, Bratislava 2001, 184 pp.;
Pedlosky, J.: Ocean Circulation Theory. Springer, Berlin 1998, 455 pp.;
Dobrovolski, S.G.: Stochastic Climate Theory. Springer, Berlin 2000, 282 pp.
The newest information from the INTERNET-u and journals.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 56

A	B	C	D	E	FX
46,43	28,57	23,21	0,0	1,79	0,0

Lecturers: prof. RNDr. Milan Lapin, CSc.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FOZ-173/10	Geomagnetism

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: 1.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
The main magnetic field, spherical harmonic analysis, Gauss coefficients, magnetic moment of the Earth, magnetic poles, secular variations. Standards of IAGA magnetic records processing on observatory and repeat stations, magnetic survey, rules and evaluation, measurements by satellite and on an aircrafts.
Physical principles and construction of the present magnetometers, absolute measurements, calibration and base. The Earth's crust influence on measurements and magnetic field variations. Magnetic anomalies.
The external magnetic field, magnetic storms, Dst index, pulsations, Sq variation. Ionospheric dynamo, geomagnetic activity and indices, equatorial electrojet, ring current.
International reference geomagnetic field (IGRF, DGRF), data processing ant their interpretation, nonlinear analysis, errors. INTERMAGNET and international centers for collecting and processing of geomagnetic records. Electromagnetic sounding, magnetotelluric sounding and data postprocessing. Paleomagnetic methods and their contribution to the Earth's magnetic field variations and reversals.

Recommended literature:
J.A. Jacobs: Geomagnetism, Vol. 1-3. Academic Press 1987
Selected papers in J. Geophys. Res.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 3

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

Lecturers: doc. RNDr. Jozef Brestenský, CSc., RNDr. Adriena Ondrášková, PhD.
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

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., 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: 734

A	B	C	D	E	FX
36,1	27,25	19,62	8,99	2,72	5,31

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

Last change: 21.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

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., 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: 480

A	B	C	D	E	FX
36,04	20,21	20,83	13,13	3,33	6,46

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

Last change: 21.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

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., 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: 165

A	B	C	D	E	FX
41,21	25,45	20,61	6,67	2,42	3,64

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

Last change: 21.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

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., 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: 90

A	B	C	D	E	FX
42,22	24,44	12,22	12,22	3,33	5,56

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

Last change: 21.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FMK-256/00	Global Climate Research

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.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
Structure and characteristic of the climate system (negative and positive feedbacks,…). Climates of the past, paleoclimatic techniques (isotopic method, ice cores, pollen, dendrochronology, lake sediments,…), theories of climatic change. Greenhouse effect. Analogue method, general circulation models. CCCM and GISS climate models. Climate simulation according to the climate models, regional downscaling techniques, climate change projection in the global and regional levels, climate scenarios in the future.

Recommended literature:
Trenberth, K.E. (1992): Climate System Modeling. Cambridge Univ. Press, 788p.
IPCC (2001): Climate Change 2001: The Scientific Basis. Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). Houghton, J. T., Ding, Y., Griggs, D. J., Noguer, M., van der Linden, P. J., Xiaosu, D. (eds.). Cambridge Univ. Press, UK, 944 pp.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 18

A	B	C	D	E	FX
94,44	5,56	0,0	0,0	0,0	0,0

Lecturers: RNDr. Marián Melo, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FOZ-241/10	Global Climate System

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: 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: 1

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

Lecturers: prof. RNDr. Milan Lapin, CSc., RNDr. Marián Melo, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FOZ-155/15	Hydrogen Energetics and Energy Storage 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: 3.

Educational level: 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: 20

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

Lecturers: doc. RNDr. Marcela Morvová, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB/2-FOZ-203/10	Isotope Methods in Environmental Physics

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: 4.

Educational level: II.

Prerequisites:

Course requirements:
A student can earn 30% per semester for the course project and its presentation, and the final written exam is weighted at 70%. A student must earn at least half of the points for the project to pass the final written examination. The student must also score at least 36 points on the final written examination.
Grades: A (100-91), B (90-81), C (80-71), D (70-61), E (60-51), FX (50-0).
Mid-term / final assessment weighting: 30% mid-term assessment (project + presentation) / 70% final written exam.
Scale of assessment (preliminary/final): 30/70

Learning outcomes:
By completing the course, the student will gain a comprehensive knowledge of the applications of stable and radioactive isotopes in the monitoring and study of environmental processes.

Class syllabus:
Stable isotopes: 1. Properties of ecologically significant stable isotopes. 2. Physico-chemical basis of isotope fractionation. Isotope delta notation. 3. Stable isotopes of hydrogen, carbon and oxygen. Meteoric water line. 4. Isotope fractionation in open and closed systems. 5. Use of isotopes as tracers of pollution, species migration and in medicine. 6.The role of isotopes in the observation of global climate change.
Radioactive isotopes: 7. Physical basis of radionuclide applications. 8. Origin and properties of environmentally important radionuclides. 9. Radionuclides as tracers of atmospheric processes. 10. Use of radionuclides in hydrology and geology. 11. Radionuclide dating. 12. Methods of measurement of stable and radioactive isotopes. 13. International isotope standards.

Recommended literature:
B. Fry: Stable Isotope Ecology. Springer Science, (2006), 308 p.
R. E. Criss: Principles of Stable Isotope Distribution. Oxford Univesity Press, (1999), 254 p.
Mook W. G.: Isotopes in the Hydrological Cycle, IAEA Vienna, 2000
Froehlich K. (editor): Environmental Radionuclides: Tracers and Timers of Terrestrial Processes, Elsevier, 2010

Baskaran M.: Radon: A Tracer for Geological, Geophysical and Geochemical Studies, Springer, 2016

Languages necessary to complete the course:
Slovak in combination with English (some of the suggested readings are in English)

Notes:

Past grade distribution
Total number of evaluated students: 25

A	B	C	D	E	FX
40,0	8,0	24,0	12,0	16,0	0,0

Lecturers: doc. RNDr. Karol Holý, CSc., RNDr. Martin Bulko, PhD., Ing. Jakub Kaizer, PhD.

Last change: 22.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FMK-138/13	Measurements in Modern Aviation and Synoptic Meteorology

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

Number of credits: 2

Recommended semester: 2.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
Aviation
- measurement of visibility: transmisiometer, forwardscatter
- automatical detection of precipitation and phenomena
- laser measurement of height of clouds: ceilometer
- distant measurement of vertical profiles of temperature, humidity and wind: sodars and lidars
- detection of turbulence and vortex

Synoptical meteorology
- elecrical thermometer and hygrometer
- ultrasonic anemometer, -electrical barometer
- tipping bucket and weighing rain gauges, -global radiation sensor
- quesions of radiation screens/shields and homogenity of stations,

Special
- soil moisture sensor,
- leaves wettnes sensor

Recommended literature:
1. ICAO ANNEX 3 TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION
2. WMO-No.8 GUIDE TO METEOROLOGICAL INSTRUMENTS AND METHODS OF OBSERVATION

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 9

A	B	C	D	E	FX
88,89	11,11	0,0	0,0	0,0	0,0

Lecturers: RNDr. Juraj Bartok, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/2-FTL-114/00	Measuring Techniques in Solid State Physics

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: II.

Prerequisites:

Course requirements:
The evaluation of the course has a form of an oral exam, grading of which reflects the overall orientation of the student in the covered topics. Indicative evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%.
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
By completing the course, students will gain an overview of selected electrical, magnetic and optical measurement methods used for characterization of properties of solids.

Class syllabus:
Conductivity and contact phenomena. DC methods of measuring resistance and conductivity - probe methods, Van der Pauw method. Arrhenius plot – determination of activation energies. Measurement of very small currents and voltages. Hall effect. AC measurements - phase sensitive signal detection, Lock-in, measurement of differential (dI(V)/dV) characteristics, tunneling spectroscopy, impedance spectroscopy. AC susceptibility measurements. Kelvin probe measurements. Noises - intrinsic and extrinsic noises, capacitive and inductive coupling, shielding, grounding, noises in amplifiers. Measurement of lifetime, mobility and diffusion length of minority charge carriers by optical methods. Femtosecond spectroscopy - pump-probe measurement. Temperature measurement methods.

Recommended literature:
J.Brož a kol., Základy fysikálních měření (I), SPN, Praha, 1967, pp.532.
J.Brož a kol., Základy fysikálních měření (II)A, SPN, Praha, 1974, pp.295.
J.Brož a kol., Základy fysikálních měření (II)B, SPN, Praha, 1974, pp.756.
K. V. Šalimová, Fyzika polovodičov, Bratislava, 1978, pp. 448
Ralph Morrison, Grounding and Schielding Techniques, 4th edition, John Willey&Sons, Inc., New York, 1998, pp. 201, ISBN 0-471-24518-6.
Henry W. Ott, Noise Reduction Techniques in Electronic Systems, 2nd edition, John Wiley & Sons, New York, 1988, pp.426, ISBN 0-471-85068-3.
J.Jelínek, Z.Málek, Kryogenní technika, SNTL, Praha, 1982, pp.354.

V.Matuáš, Elektronické měžicí přistroje, SNTL/ALFA, Praha, 1981, pp.402.
L. Michalski, K. Eckersdorf, J. Kucharski, J. McGhee, Temperature measurement, 2nd edition, John Wiley & Sons, New York, 2000, ISBN 0-471-86779-9
A.S. Morris, Measurement and Instrumentation principles, Elsevier, Amsterdam, 2001, pp.475, ISBN 0-7506-5081-8
R.B. Northrop, Introduction to instrumentation and measurement, Taylor&Francis, London, 2005, pp.743, ISBN 0-8493-3773-9
E.L.Wolf: Principles of Electron Tunneling Spectroscopy, Oxford University Press, New York, 1989, pp.576.
KEITHLEY: Nanotechnology Measurement Handbook
KEITHLEY: Making precision Low Current and High Resistance Measurements

Languages necessary to complete the course:
Slovak in combination with English (some of the suggested readings are in English)

Notes:

Past grade distribution
Total number of evaluated students: 46

A	B	C	D	E	FX
58,7	21,74	17,39	2,17	0,0	0,0

Lecturers: doc. RNDr. Tomáš Plecenik, PhD.

Last change: 03.12.2021

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FMK-142/00	Meteorological Measurement and Observation Methods Practice

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

Number of credits: 4

Recommended semester: 1.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
Calibration of actinometrical instruments, assessments of thermograph, hygrograph, heliograph, anemograph records, evaluations of air humidity and snow cover characteristics, thermal inertia of thermometers, decoding of report INTER.

Recommended literature:
Slabá, N.: Návod pro pozorovatele meteorologických staníc ČSSR. Hydrometeorologický ústav Praha, 1972, 224 s.
Jevnevič, T. M., Poltaraus, B.V., Samojlenko, V. S.: Meteorologičeskij praktikum. Vyd. Moskovskej univerzity, Moskva, 1981, 176 s.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 37

A	B	C	D	E	FX
91,89	8,11	0,0	0,0	0,0	0,0

Lecturers: RNDr. Juraj Bartok, PhD.

Last change: 02.06.2015

Approved by:

STATE EXAM DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KJFB/2-FOZ-955/15	**Course title:** Meteorology, Climatology and Hydrology
Number of credits: 4	
Educational level: II.	
State exam syllabus:	
Last change: 02.06.2015	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB+KAFZM/2-FOZ-108/15	Methods for Data Sets Analysis

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: 4

Recommended semester: 1.

Educational level: 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: 37

A	B	C	D	E	FX
40,54	27,03	16,22	13,51	2,7	0,0

Lecturers: doc. RNDr. Ivan Sýkora, PhD., RNDr. Ingrid Damborská, CSc.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FMK-106/15	Methods of Analysis in Meteorology and Climatology

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: 2.

Educational level: II.

Prerequisites:

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

Learning outcomes:
Familiarization with the theory of statistical dependence research and time series analysis, which is widely used especially in the study of climate change and variability. Illustrations and solving practical tasks in the field of meteorology and climatology.

Class syllabus:
Analysis of variance (introduction, One-Factor Analysis of variance, Two-Factor Analysis of variance, multifactorial experiments in solving climatological and practical problems. Two-dimensional basic set, statistical investigation of dependence. Correlation in climatology. Linear regression analysis, nonlinear regression. Correlation Ratio, Coefficient of Determination, Correlation Coefficient. Multiple correlation and regression, step regression. Use of analytical equations to express climatic phenomena. Measurement of Association, total and partial association. Basic conditions of time series construction, characteristics of time series analysis. Analysis of individual components of the time series, analytical comparison of time series. Dependence in time series, synchronous and asynchronous correlation. Climate series balancing. Homogeneity tests of time series (parametric and nonparametric).

Recommended literature:
Nosek, M.: Metody v klimatologii. Praha, Academia 1972. 431s.
General Climatology 1B: Elements of Statistical Analysis. World Survey of Climatology, Vol. 1B, The Netherlands, 1985. 424s.
Lamoš, F., Potocký, F.: Pravdepodobnosť a matematická štatistika, štatistické analýzy. Bratislava, Alfa 1989. 342s.
Sheldon M. Ross: Introductory statistics. Third edition. Elsevier 2010, 818p.

Guide to Climatological Practices. WMO – No.100, Geneva, 1983

Languages necessary to complete the course:
Slovak in combination with English (some of the suggested readings are in English)

Notes:

Past grade distribution
Total number of evaluated students: 16

A	B	C	D	E	FX
87,5	6,25	6,25	0,0	0,0	0,0

Lecturers: prof. RNDr. Milan Lapin, CSc., RNDr. Ingrid Damborská, CSc.

Last change: 15.03.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FMK-231/00	Microclimatology and Agrometeorology

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: 4.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
Microclimatological and agroclimatological sub-system, factors and processes active in these areas. Basic data and sources used in the subjects listed above. Agroclimatic and microclimatic patterns, normals and characteristics according to selected elements. Evaporation, water balance and soil moisture. Atmospheric circulation in the ground level layer. Phenology and phanometry. Forest bioclimatology. Pest and diseases in the agriculture and forestry. Agrometeorological and biometeorological forecasts. Agroclimatic conditions in Slovakia. Tasks for agrometeorology at plants protection. Economical efficiency of agrometeorology.

Recommended literature:
Chrgian, A.Ch.: Fizika atmosfery, Tom 1, 2. Gidrometeoizdat, Leningrad 1978, 247 and 319 pp.
Netopil, R. et al.: Fyzická geografie 1. SPN, Praha, 1984,273 pp.
Nosek, M.: Metody v klimatologii. Academia, Praha 1973, 434 pp.
Havlíček, V. et al.: Agrometeorologie. SZN, Praha, 1986, 260 pp.
Šamaj, F., Prošek, P., Čabajová, Z.: Agrometeorológia a bioklimatológia. Vyd.UK Bratislava, Bratislava, 1994, 306 pp.
Petrík, M. et al.: Lesnícka bioklimatológia. Príroda, Bratislava, 1986, 346 pp.
Lapin, M., Tomlain, J.: Všeobecná a regionálna klimatológia, Vyd. UK Bratislava, Bratislava 2001, 184 pp.
Špánik et al.: Aplikovaná agrometeorológia. SPU Nitra, 1997, 196 pp.
The newest information from the INTERNET and journals.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 26

A	B	C	D	E	FX
65,38	23,08	11,54	0,0	0,0	0,0

Lecturers: prof. RNDr. Milan Lapin, CSc., RNDr. Ingrid Damborská, CSc.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB/2-FJF-249/16	Modelling of Radiation Interaction with Matter

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: 4.

Educational level: II.

Prerequisites:

Course requirements:
Semestral project, oral examination
Approximate grade thresholds: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 50/50

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

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. Stanislav Tokár, DrSc., RNDr. Tibor Ženiš, PhD., Mgr. Róbert Breier, PhD.

Last change: 20.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF+KAMŠ/2-FOZ-106/10	New Renewable Energy Sources (1)

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: 1.

Educational level: 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: 30

A	B	C	D	E	FX
96,67	0,0	0,0	0,0	3,33	0,0

Lecturers: doc. RNDr. Ján Boďa, CSc., prof. RNDr. Peter Kúš, DrSc.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/2-FOZ-115/10	New Renewable Energy Sources (2)

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: 2.

Educational level: 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: 28

A	B	C	D	E	FX
46,43	28,57	21,43	3,57	0,0	0,0

Lecturers: doc. RNDr. Tomáš Roch, Dr. techn., prof. RNDr. Peter Kúš, DrSc.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB/2-FOZ-202/10	Nuclear Energy and the Environment

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: II.

Prerequisites:

Course requirements:
The course assessment consists of test (20%), and final oral exam (80%).
Grading: A (100-91), B (90-81), C (80-71), D (70-61), E (60-51), Fx (50-0).
Scale of assessment (preliminary/final): Practical work 20% (test) / 80% final exam.
Scale of assessment (preliminary/final): 20/80

Learning outcomes:
Students will learn about the physical nature of nuclear energy and its use, with emphasis on the importance of nuclear energy for the technical and economic development of society and its impact on the environment.

Class syllabus:
General laws governing nuclear reactions with neutrons. Interaction of neutrons with the material environment. Neutron deceleration and diffusion. Activation of materials by neutrons. Fission of atomic nuclei. Chain reaction, multiplication factor. Critical equation in one and two group approximation. Short and long term kinetics of nuclear reactors. Design and types of nuclear reactors. Reactors of the IV. Generation. Thermonuclear reactors. Main parts of a nuclear power plant. Exchangers. Circulation pumps. Piping and fittings. Steam turbines. Protective envelope. Barbotage technique. Effect of radiation on corrosion. Moderators and reflectors. Modeling the transfer of radioactivity from nuclear waste repositories to the environment. Physics of the start-up of a nuclear power plant. Decommissioning of nuclear power plants. Radiation sources and their shielding. Shielding of nuclear sources. Transfer of radioactivity in the primary circuit of a nuclear reactor. Radioactive waste. Economics of nuclear power. Nuclear energy and the environment.

Recommended literature:
P. Otčenášek: Základy konstrukce a funkce jaderných elektráren, Skriptá ČVUT v Prahe, 2003
V. Slugeň a kol.: Jadrové zariadenia, jadrová bezpečnosť, SNUS, 2009
M. Florek: Experimentálna jadrová a subjadrová fyzika: Časť neutrónová fyzika. Univerzita Komenského v Bratislave, 1992

Languages necessary to complete the course:
Slovak in combination with English (some of the suggested readings are in English).

Notes:

Past grade distribution
Total number of evaluated students: 23

A	B	C	D	E	FX
69,57	8,7	8,7	8,7	4,35	0,0

Lecturers: doc. RNDr. Jaroslav Staníček, PhD., doc. RNDr. Monika Müllerová, PhD.

Last change: 21.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB/2-FJF-138/00	Nuclear Geophysics and Astrophysics

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: 4.

Educational level: II.

Prerequisites:

Course requirements:
Interim evaluation: test
Final assessment: oral examination
Indicative rating scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 30/70

Learning outcomes:
To point to the application of nuclear-physical knowledge in the field of astrophysics and cosmology, as well as to the interconnectedness of these disciplines and to teach basic knowledge about the production of applications of cosmogenic and primordial nuclides.

Class syllabus:
1. Big Bang and Nucleosynthesis
2. r and with processes,
3. The formation of the megastructure of the universe,
4. formation of the solar system,
5. Meteorites - their origin, properties,
6. The inner and outer planets of the solar system,
7. Cosmic radiation,
8. Nuclear reactions of cosmic radiation
9. Production of cosmogenic nuclides in extraterrestial objects,
10. the production of cosmogenic nuclides in the Earth's atmosphere,
11. in situ production of cosmogenic nuclides.
12. Isotopic dating methods

Recommended literature:
Cosmic rays and particle physics by Thomas K. Gaisser. Cambridge : Cambridge University Press, 1992
Theoretical astrophysics : Volume 1 : Astrophysical processes / T. Padmanabhan. Cambridge : Cambridge University Press, 2000

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 39

A	B	C	D	E	FX
66,67	23,08	5,13	5,13	0,0	0,0

Lecturers: prof. RNDr. Jozef Masarik, DrSc.

Last change: 20.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FMK-131/00	Optical and Electrical Phenomena in the Atmosphere

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: 1.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
Photometric characteristics and units, Sun as a source of light, visibility, night sky radiation, halo phenomena, rainbow, corona, glory, mirage, Earth electric field, lightning, polar aurora, refraction, human eye.

Recommended literature:
Bednář, J.: Pozoruhodné jevy v atmosféře. Atmosferická optika, akustika a elektrina. Academia, Praha, 1989, 236 pp.
Hrvoľ, J., Tomlain, J.: Žiarenie v atmosfére. Univerzita Komenského, Bratislava, 1997, 136 pp.
Feynman, R.P., Leighton, R.B., Sandr, M.: Feynmanove prednášky z fyziky 2. Alfa, Vydavateľstvo technickej a ekonomickej literatúry, Bratislava, 1982, 496 pp.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 14

A	B	C	D	E	FX
78,57	7,14	14,29	0,0	0,0	0,0

Lecturers: RNDr. Ján Hrvoľ, CSc.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FOZ-186/15	Options for Regulation of the Greenhouse Gases Content in the Atmosphere

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: 2.

Educational level: 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: 30

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

Lecturers: doc. RNDr. Marcela Morvová, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB+KEF/2-FBF-102/00	Physical Chemistry and Electrochemistry

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: 1.

Educational level: I., II.

Prerequisites:

Course requirements:
Continuous assessment: homework
Exam: oral
The evaluation of the subject takes place in the form of continuous (individual work -20% of total score) 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 50%
Scale of assessment (preliminary/final): 20/80

Learning outcomes:
The student will have developed a basic apparatus for understanding the physical nature of chemical processes, which may be encountered in other subjects (biochemistry, bioenergetics, plasma physics) as well as with the principles of some analytical methods used e.g. in biophysics.

Class syllabus:
Thermochemistry, creative, reaction and bond enthalpies, their use. Fundamentals of chemical thermodynamics, chemical potential and its application to the study of equilibrium processes. Fugacity, fugacity coefficient, activity, activity coefficient. Chemical equilibrium, equilibrium constant and its dependence on state variables. Affinity of a chemical reaction, conditions of spontaneous chemical course. reactions. Acid-base reactions and the theory of acids and bases. Galvanic cell, electrode potential, its use for measuring physico-chemical quantities. Introduction to chemical kinetics. Reaction order, methods of determining the reaction order. Reaction mechanisms and their relation to the kinetic equation. Homogeneous and heterogeneous catalysis. Autocatalysis, oscillating reactions.

Recommended literature:
http://www.chem1.com/acad/webtext/virtualtextbook.html

Languages necessary to complete the course:

english

Notes:

Past grade distribution
Total number of evaluated students: 106

A	B	C	D	E	FX
60,38	32,08	4,72	0,0	0,0	2,83

Lecturers: prof. Ing. Pavel Mach, CSc., prof. RNDr. Ján Urban, DrSc., doc. RNDr. Peter Papp, PhD.

Last change: 18.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTV/2-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: 2

Recommended semester: 1.

Educational level: II.

Prerequisites:

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

Learning outcomes:

Class syllabus:
Practicing of the students´ game skills in collective sports: basketball, volleyball, football, floorball and hockey. Mastering of the basic technique of a particular sport discipline in other sports. In paddling, basic training on still and slightly flowing water. Development of coordination skills, improvement of articular mobility and cardiovascular system.

Recommended literature:

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 1657

A	B	C	D	E	FX
98,37	0,6	0,06	0,0	0,0	0,97

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, Mgr. Tomáš Lovecký

Last change: 15.03.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTV/2-MXX-120/00	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: 2

Recommended semester: 2.

Educational level: II.

Prerequisites:

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

Learning outcomes:

Class syllabus:
Practicing of offensive and defensive game combinations and playing with modified rules in collective sports such as basketball, volleyball, football, floorball, hockey. Command of elements of higher difficulty in locomotion skills (swimming - crawl stroke, breast stroke, butterfly stroke, trampoline jumping and aerobics – practicing of areobics compositions, bodybuilding – development of the main muscle groups, paddling on running water. Testing of the level of physical fitness and coordination skills.

Recommended literature:

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 1557

A	B	C	D	E	FX
98,52	0,39	0,06	0,06	0,06	0,9

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

Last change: 15.03.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTV/2-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: II.

Prerequisites:

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

Learning outcomes:

Class syllabus:
To improve offensive and defensive game combinations in collective sports. Practicing of tactical and technical elements in individual sports. Compensatory exercises to correct wrong body posture. Stretching. Competition rules in sport disciplines.

Recommended literature:

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 1281

A	B	C	D	E	FX
98,75	0,47	0,08	0,0	0,0	0,7

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, Mgr. Tomáš Lovecký

Last change: 15.03.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTV/2-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: II.

Prerequisites:

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

Learning outcomes:

Class syllabus:
Sport training for Faculty Championships in a selected sport with modified rules. Selection of sport-talented students into teams of the Faculty Sport League, University League of Bratislava Faculties, and participation in sport events of the Faculty and University.

Recommended literature:

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 1110

A	B	C	D	E	FX
98,47	0,45	0,09	0,09	0,09	0,81

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

Last change: 15.03.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FMK-113/00	Physics of Clouds and Precipitation

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: II.

Prerequisites:

Course requirements:
Preliminary evaluation:
Final exam: oral / written
Indicative evaluation 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 about the mechanisms of cloud formation and precipitation, microstructure and cloud macrostructure, special cloud and precipitation problems.

Class syllabus:
Thermodynamics of phase transitions. Condensation nuclei and mechanisms of their action. Methods of calculating vertical speeds in the atmosphere. Vertical flows in the boundary layer of the atmosphere. Condensation of water vapor in the ground layer of the atmosphere. Thermodynamic conditions of the formation of masses. Convection in the atmosphere, macrostructic and layered cloud cover, CAPE and CIN quantities. Cloud microstructure and physical processes in the clouds. Theory of condensation growth of cloud drops and ice particles. Coalescence in the atmosphere and coalescent growth of cloud drops. The theory of the origin of precipitation (Bergeron and Findeisen's theory, the coalescent theory). Physical conditions for precipitation in the ground layer of the atmosphere. Precipitation measurement errors. Physical aspects of the formation and changes of snow cover. Electrical and optical properties of clouds and precipitation. Artificial interventions in clouds and precipitation.

Recommended literature:
Řezáčová, D., Novák, P., Kašpar, M., Setvák, M. (2007): Fyzika oblaků a srážek. Academia, Praha, 574 s.
Khvorostyanov V.I. a Curry J.A. (2014): Thermodynamics, kinetics and microphysics of Clouds, Cambridge Press, Oxford
Wang et al (2013): Physics and Dynamics of Clouds and Precipitation, Cambridge Press, Oxford
Chrgijan, A., Ch. (1978): Fizika atmosfery, Tom 1, 2, Gidrometeoizdat - Leningrad, 247 s. a 319 s.

Pruppacher H.R., Klett J.D. (1997): Microphysics of Clouds and Precipitation. Kluwer Academic Publishers, Oxford

Languages necessary to complete the course:
Slovak in combination with English (some of the suggested readings are in English)

Notes:

Past grade distribution
Total number of evaluated students: 33

A	B	C	D	E	FX
60,61	21,21	12,12	6,06	0,0	0,0

Lecturers: prof. RNDr. Milan Lapin, CSc., RNDr. Ingrid Damborská, CSc.

Last change: 15.03.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FOZ-107/15	Physics of Lower Atmospheric Layers

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: II.

Prerequisites:

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

Learning outcomes:
To explain the elementary knowledge of atmospheric dynamic.

Class syllabus:
The horizontal flows and their classification. The advective changes of temperature by geostrophic wind. The ageostrophic wind. The altitude change of geostrophic wind in the various oriented thermobaric field. The time changes of temperature and air pressure in the dependence to direction and changes of geostrophic wind by altitude. Thermal wind. Slope of isobaric and frontal surfaces. Frontogenesis and frontolysis. Speed of frontal line. Continuity equation and pressure tendency equation, Vorticity equation. Bjerknes, Kelvin circulation theorem.

Recommended literature:
Pechala, F., Bednář, J.:Příručka dynamické meteorologie. Academia, Praha, 1991, 372s.
Holton, J.R.: An Introduction to Dynamic Meteorology. Academic Press, London, 1992, 511p.
Tomlain, J., Damborská, I.: Fyzika hraničnej vrstvy atmosféry. Vyd.UK Bratislava, Bratislava, 1999, 132s.
Bluestein, H.B.: Synoptic-Dynamic Meteorology in Midlatitudes, Vol.1, Oxford Univ.Press., 1992, 431 pp.

Languages necessary to complete the course:
Slovak in combination with English (some of the suggested readings are in English).

Notes:

Past grade distribution Total number of evaluated students: 35					
A	B	C	D	E	FX
45,71	14,29	22,86	8,57	8,57	0,0
Lecturers: doc. RNDr. Martin Gera, PhD.					
Last change: 14.03.2022					
Approved by:					

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FOZ-105/15	Physics of Soil and Water

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: 2.

Educational level: 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: 21

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

Lecturers: doc. RNDr. Marcela Morvová, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FOZ-110/13	Pollutants Transport in the Atmosphere

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: 2.

Educational level: 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: 40

A	B	C	D	E	FX
65,0	20,0	5,0	5,0	5,0	0,0

Lecturers: prof. RNDr. Milan Lapin, CSc., RNDr. Martin Kremler, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB/2-FOZ-204/10	Practicum in Radiatonal Monitoring

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

Number of credits: 3

Recommended semester: 4.

Educational level: 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: 24

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

Lecturers: doc. RNDr. Ivan Sýkora, PhD., doc. RNDr. Monika Müllerová, PhD., Mgr. Ivan Kontuľ, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FMK-115/00	Pre-diploma Field Practice

Educational activities:
Type of activities: practice
Number of hours:
per week: **per level/semester:** 4t
Form of the course: on-site learning

Number of credits: 1

Recommended semester: 2.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
To acquaint with Department of weather forecasts SHMI, operating organization at division of general forecasts, briefings, forecast preparation, forecast numerical model outputs, organization of aviation meteorological service, preparation of aeronautical weather forecasts and warnings. Detailed acquaintance with operation of chosen station by diploma thesis theme, obtaining new information and solving of some problems at diploma thesis.

Recommended literature:
According to instruction of diploma thesis principal

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 34

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

Lecturers: RNDr. Ingrid Damborská, CSc.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB+KAFZM/2-FOZ-912/15	Preparation of Diploma Thesis

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

Number of credits: 3

Recommended semester: 3.

Educational level: 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: 29

A	B	C	D	E	FX
93,1	3,45	3,45	0,0	0,0	0,0

Lecturers: prof. RNDr. Ján Urban, DrSc., prof. RNDr. Milan Lapin, CSc., doc. RNDr. Ivan Sýkora, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB/2-FJF-126/00	Radiation Environmental Physics

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: 2.

Educational level: II.

Prerequisites:

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

Learning outcomes:
Students will gain an understanding of the sources, distribution, migration, dispersion, measurement and applications of radionuclides in the environment.

Class syllabus:
1. Sources of ionizing radiation in the biosphere. Primordial and cosmogenic radionuclides.
2. Anthropogenic radionuclides. Ecologically significant radionuclides, radiotoxicity.
3. Distribution, migration and transport of radionuclides in nature.
4. Basic characteristics of radon, solubility, potential alpha energy, equivalent activity concentration.
5. Accumulation of radon decay products.
6. Radon in the outdoor atmosphere, in soil and in living quarters, risk of exposure.
7. Methods of monitoring environmental contamination and environmental processes, reasons for measurement of 226Ra, 232Th, 40K in soils and building materials
8. Measurement of radioactivity in the atmosphere, soil and water, measurement of 222Rn in living quarters and soil.
9. Neutron activation and X-ray fluorescence analysis of environmental pollutants.
10. Effective dose from inhalation of radionuclides.
11. Dose rate from terrigenous radionuclides.
12. Use of radionuclides as tracers of natural processes.
13. National regulations and international recommendations for protection against ionizing radiation.

Recommended literature:
Holá O., Holý K.: Radiačná ochrana : Ionizujúce žiarenie, jeho účinky a ochrana pred ionizujúcim

žiarením. - 1. vyd. - Bratislava : Slovenská technická univerzita, 2010.
Baskaran M.: Radon: A Tracer for Geological, Geophysical and Geochemical Studies, Springer,2016
R. Tykva, D. Berg: Man-Made and Natural Radioactivity in Environmental Pollution and Radiochronology, Kluwer Academic Publishers, 2004
P.P.Povinec, J.A.Sanchez-Cabeza: Radionuclides in the Environment, Elsevier, 2006

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 63

A	B	C	D	E	FX
63,49	15,87	15,87	1,59	1,59	1,59

Lecturers: doc. RNDr. Karol Holý, CSc.

Last change: 22.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FMK-144/00	Radiation in the Atmosphere

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.

Educational level: II.

Prerequisites:

Course requirements:
Preliminary evaluation: homework / written assignments
Final exam: oral / written
Indicative evaluation 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 able to understand the importance of solar radiation as a climatic factor and will know the basic processes of absorption and scattering of solar radiation in the atmosphere, as well as the process of transformation of solar radiation.

Class syllabus:
-solar radiation, basic characteristics, laws of absolute black body radiation, spectral composition of solar radiation at the upper limit of the atmosphere, solar constant.
-extinction of solar radiation in the atmosphere, extinction coefficient, expensive sunlight in the atmosphere, molecular scattering of solar radiation, polarization of scattered sky radiation, scattering of solar radiation on dust particles and water droplets, extinction of solar radiation in atmospheric by absorption
-Radiation balance of the Earth's surface, atmosphere and Earth's surface-atmosphere system, direct and scattered solar radiation, global radiation, albedo, shortwave radiation balance, longwave radiation balance, total radiation balance of the Earth's surface, greenhouse effect, radiation balance of the atmosphere, radiation balance of the Earth's system surface-atmosphere
-Radiation balance of differently oriented inclined surfaces, flux of direct, scattered and global radiation on different inclined surfaces, methods of determining daily and monthly amounts of global radiation on differently oriented inclined surfaces.

Recommended literature:
An Introduction to Atmospheric Radiation / K.N. Liou, 2nd Edition Elsevier, 2002

Languages necessary to complete the course:
Slovak and English

Notes:

Past grade distribution
Total number of evaluated students: 20

A	B	C	D	E	FX
70,0	30,0	0,0	0,0	0,0	0,0

Lecturers: RNDr. Juraj Bartok, PhD.

Last change: 14.03.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB/2-FOZ-277/15	Radionuclide Dating

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: 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: 0

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

Lecturers: RNDr. Miroslav Ješkovský, PhD.

Last change: 28.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB/2-FOZ-242/15	Radionuclides Monitoring 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: 3.

Educational level: II.

Prerequisites:

Course requirements:
Exam: written and oral exam, successful completion of the written part is condition of the oral part.
Share in the overall rating: 80/20.
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 gain knowledge about the basic methods of monitoring radionuclides in various components of the environment.

Class syllabus:
Basic principles of radioactivity measurement, sources of radioactivity in the environment, Specifics of radioactivity measurements, Basic characteristics of detectors, Gas, semiconductor and scintillation radiation detectors, Methods of measuring volume activity. Criteria for method selection, sampling, adjustment, optimization of measurement conditions, concept of low activity, quality coefficient, detection limits. Background, an overview of methods of reducing it. Analysis of samples containing alpha emitters. Determination of beta-emitter activity. Determination of detection efficiency for quenching samples. Methods for determination of tritium and radiocarbon. Gamma spectrometry of environmental samples. Instrument spectrum processing. Spectrometric chain with semiconductor detector. Methods of monitoring radioactivity of the atmosphere, methods of monitoring radioactivity of soil and water, applications of monitoring methods.

Recommended literature:
S. Usačev a kol.: Experimentálna jadrová fyzika, Alfa, Bratislava, 1982,
J. Šeda a kol.: Dozimetrie ionizujúcího záření, SNTL, Praha, 1983,
Š. Šáro: Detekcia a spektrometria žiarenia alfa a beta, Alfa, Bratislava, 1983,
G. F. Knoll: Radiation detection and measurements, J.Wiley & Sons, NewYork, 2000,
W. R. Leo: Techniques for Nuclear and Particle Physics Experiments, Springer Verlag, 1994,
K. Kleinknecht: Detectors for particle radiation, Cambridge University Press, 1998, 246p

Languages necessary to complete the course:
Slovak in combination with English (some of the suggested readings are in English)

Notes:

Past grade distribution
Total number of evaluated students: 15

A	B	C	D	E	FX
13,33	26,67	20,0	33,33	6,67	0,0

Lecturers: doc. RNDr. Ivan Sýkora, PhD.

Last change: 16.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FMK-246/00	Remote Sensing in Meteorology

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: 4.

Educational level: II.

Prerequisites:

Course requirements:
Preliminary evaluation: elaboration of 1-2 papers
Final exam: oral
Indicative evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 80/20

Learning outcomes:
Gain knowledge about the principles and products of remote sensing with regard to their use in meteorology and other related fields.

Class syllabus:
Physical principles of remote sensing. Instrumentation for remote sensing in meteorology: Active - passive sensors, imagery - profilers, radars, lidars, spectrophotometers. Data processing into products. Principles of RGB composites, the most commonly used RGB composites and their interpretation. Detection of meteorological phenomena and elements: different types of clouds, fog, wind fields, snow cover, glaciation, moisture distribution, types of air masses, properties of the earth surface and oceans, total ozone, atmospheric discharges, carbon dioxide concentrations, etc. Detection of non-meteorological phenomena: forest fires, vegetation index, fire risk index. Current trends in remote sensing.

Recommended literature:
Current sources of literature, scientific journals and Internet information will be available from the lecturer on an ongoing basis.
Older literature:
Carlsson, C.G.: An Introduction to Remote Sensing in Meteorology. SHMI, Sweden, Norrkoping 1997,315 pp.
Reinhart, R.E.: Radar for Meteorologists. 2nd ed., North Dakota, USA, 1992, 334 pp.
Rao, P.K. at all.: Weather Satellites – Systems, Data and Environmental Applications, 2nd ed. AMS USA, Boston, 1994, 503 pp
A Feranec, J. a kol: Slovensko očami satelitov, Veda, Bratislava, 2010, 263s.

Feranec, J. a kol: Meniace sa Slovensko očami satelitov +DVD, Veda, Bratislava,2012, 74.
European Organisation for the Exploitation of Meteorological Satellites: MSG Interpretation Guide, EUMETSAT, 2004, https://www.eumetsat.int/msg-interpretation-guide

Languages necessary to complete the course:
Slovak in combination with English (some of the suggested readings are in English)

Notes:

Past grade distribution
Total number of evaluated students: 8

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

Lecturers: Mgr. Marián Jurášek

Last change: 15.03.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

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., 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: 707

A	B	C	D	E	FX
58,56	16,55	11,03	4,38	1,84	7,64

Lecturers: Viktoria Mirsalova

Last change: 20.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

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., 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: 421

A	B	C	D	E	FX
65,08	15,68	8,79	3,8	0,95	5,7

Lecturers: Viktoria Mirsalova

Last change: 20.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

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., 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: 200

A	B	C	D	E	FX
70,5	17,5	8,5	2,5	0,0	1,0

Lecturers: Viktoria Mirsalova

Last change: 20.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

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., 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: 144

A	B	C	D	E	FX
75,69	13,19	6,94	2,78	0,69	0,69

Lecturers: Viktoria Mirsalova

Last change: 20.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FMK-202/00	Satellite and Radar Observations of Meteorological Phenomena

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: 1.

Educational level: II.

Prerequisites:

Course requirements:
Preliminary evaluation: 2 tests
Final exam: oral / written
Indicative evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 80/20

Learning outcomes:
Gain knowledge about the principles of observing meteorological phenomena using meteorological satellites and radars.

Class syllabus:
History of meteorological radars. Radar block scheme. Radar signal propagation through the atmosphere. Radar equation. Quantities measured by radar. Meteorological phenomena detectable by radar. Problems and their solutions in meteorological radar measurements. Radar measurement products. Meteorological radar network of the Slovak Republic and international data exchange. Electromagnetic spectrum. Physical laws of radiation. Changing the intensity of radiation by passing through a layer. Two stream approximation. Schematic equation for radiation intensity measured by satellite. Types of sensors. Orbits of satellites and meteorological satellites. Sensor signal processing. Principles of RGB composites. Detection of meteorological phenomena using meteorological satellites. EUMETSAT.

Recommended literature:
Current sources of literature, scientific journals and Internet information will be available from the lecturer on an ongoing basis.
Older literature:
Carlsson, C.G.: An Introduction to Remote Sensing in Meteorology. SHMI, Sweden, Norrkoping 1997,315 pp.
Reinhart, R.E.: Radar for Meteorologists. 2nd ed., North Dakota, USA, 1992, 334 pp.
Doviak, R.J., Zrnic, D.S.: Doppler Radar and Weather Observations, Academic Press, London, 1992, 562 pp.

Rao, P.K. at all.: Weather Satellites – Systems, Data and Environmental Applications, 2nd ed. AMS USA, Boston, 1994, 503 pp
Feranec, J. a kol: Slovensko očami satelitov, Veda, Bratislava, 2010, 263s.
Feranec, J. a kol: Meniace sa Slovensko očami satelitov +DVD, Veda, Bratislava,2012, 74

Languages necessary to complete the course:
Slovak in combination with English (some of the suggested readings are in English)

Notes:

Past grade distribution
Total number of evaluated students: 47

A	B	C	D	E	FX
95,74	2,13	2,13	0,0	0,0	0,0

Lecturers: prof. RNDr. Milan Lapin, CSc., Mgr. Marián Jurášek

Last change: 15.03.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FOZ-174/10	Seismology

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: 1.

Educational level: 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: 1

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

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

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FMK-251/00	Selected Problems of Meteorology and Climatology

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

Number of credits: 2

Recommended semester: 4.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
Selection of topics depends from students interest, their diploma theses and actual problems in this field. For example: Actual information from the world meteorological and climatological centres, greenhouse effect, climate models, National climate programme of SR, reports about diploma theses from the climatology,…

Recommended literature:
Scientific contributions in world and Slovak journals

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 6

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

Lecturers: RNDr. Marián Melo, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FOZ-171/10	Semester Project (1)

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

Number of credits: 5

Recommended semester: 1.

Educational level: 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: 8

A	B	C	D	E	FX
87,5	12,5	0,0	0,0	0,0	0,0

Lecturers: doc. RNDr. Sebastián Ševčík, CSc.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FOZ-181/10	Semester Project (2)

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

Number of credits: 5

Recommended semester: 2.

Educational level: 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: 2

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

Lecturers: prof. RNDr. Milan Lapin, CSc.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB/2-FOZ-271/10	Semester Project (3)

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

Number of credits: 5

Recommended semester: 3.

Educational level: 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: 1

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

Lecturers: doc. RNDr. Karol Holý, CSc., doc. RNDr. Ivan Sýkora, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FOZ-206/15	Seminar in Applied Meteorology (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: II.

Prerequisites:

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

Learning outcomes:
By completing the seminar, the student will deepen their knowledge of atmospheric physics. They will learn to independently lecture selected parts of dynamic meteorology, atmospheric boundary layer physics, physics of clouds and precipitation.

Class syllabus:
Study, preparation and presentation of separate performances from selected topics.

Recommended literature:
The latest literature, sources from professional and scientific journals and information published on the Internet as recommended by the lecturer at the beginning of the semester

Languages necessary to complete the course:
Slovak in combination with English (some of the suggested readings are in English)

Notes:

Past grade distribution
Total number of evaluated students: 13

A	B	C	D	E	FX
92,31	7,69	0,0	0,0	0,0	0,0

Lecturers: RNDr. Ingrid Damborská, CSc.

Last change: 15.03.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FOZ-207/15	Seminar in Applied Meteorology (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: II.

Prerequisites: FMFI.KAFZM/2-FOZ-206/15 - Seminar in Applied Meteorology (1)

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

Learning outcomes:
By completing the seminar, the student will deepen their knowledge of atmospheric physics. They will learn to independently lecture selected parts of dynamic meteorology, atmospheric boundary layer physics, physics of clouds and precipitation.

Class syllabus:
Study, preparation and presentation of separate performances from selected topics.

Recommended literature:
The latest literature, sources from professional and scientific journals and information published on the Internet as recommended by the lecturer at the beginning of the semester.

Languages necessary to complete the course:
Slovak in combination with English (some of the suggested readings are in English)

Notes:

Past grade distribution
Total number of evaluated students: 13

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

Lecturers: RNDr. Ingrid Damborská, CSc.

Last change: 15.03.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB+KAFZM/2-FOZ-213/15	Seminar in Environmental Physics, Renewable Energy Sources, Meteorology and Climatology

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: 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: 29

A	B	C	D	E	FX
96,55	3,45	0,0	0,0	0,0	0,0

Lecturers: prof. RNDr. Ján Urban, DrSc., doc. RNDr. Karol Holý, CSc., prof. RNDr. Milan Lapin, CSc.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FOZ-276/15	Seminar in Numerical Modelling and Simulation in Meteorology

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: 3

Recommended semester: 3.

Educational level: 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: 4

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

Lecturers: doc. RNDr. Martin Gera, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

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., II.

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: 23

A	B	C	D	E	FX
47,83	0,0	0,0	0,0	0,0	52,17

Lecturers: Mgr. Aneta Barnes

Last change: 21.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

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., II.

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: 22

A	B	C	D	E	FX
81,82	0,0	4,55	0,0	0,0	13,64

Lecturers: Mgr. Aneta Barnes

Last change: 21.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

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., II.

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: 8

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

Lecturers: Mgr. Aneta Barnes

Last change: 21.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

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., II.

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: 7

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

Lecturers: Mgr. Aneta Barnes

Last change: 21.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FOZ-205/15	Solutions of Atmospheric Dynamics Equations

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.

Educational level: II.

Prerequisites:

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

Learning outcomes:
Application of numerical procedures for solving equations of atmospheric dynamics, utilization of numerical meteorological and climatological models for weather forecasting and preparation of climate change scenarios.

Class syllabus:
Scale analysis of hydrodynamic equation, geostrophic and quasi - geostrophic type of equations. Shallow water model, conservation of potential vorticity, contribution of vorticity and divergence to the solution depending on the size of the processes. Barotropic instability of atmospheric waves, structure of these waves, two-level model of baroclinic atmosphere, analysis of wave structure. Numerical methods, discrete network transition problems, minimal wave, consistency, convergence, stability, finite difference method, advection equation. Nonlinear instability and aliasing, conservation of energy in the model, The Arakawa Jacobian. Spectral methods, finite element method. Stability of schemes, adjustments and efficiency of calculation. Explicit and implicit methods. Elliptic differential equations, parabolic differential equations. Predictive and climatological models.

Recommended literature:
An introduction to dynamic meteorology / James R. Holton. New York : Academic Press, 1992
Predictability of Weather and Climate / Tim Palmer and Renate Hagedorn, Cambridge University Press 0521848822, 2006, 702pp.
Partial Differential Equations with Numerical Methods / S. Larsson and V. Thomée, Texts in Applied Mathematics 45, Springer, 2003
Numerical Weather and Climate Prediction / Thomas T. Warner, 2011. , Cambridge University Press, Cambridge, UK. ISBN: 978-0-521-51389-0. Hardback, 526 PP.

Languages necessary to complete the course:
Slovak in combination with English (some of the suggested readings are in English).

Notes:

Past grade distribution
Total number of evaluated students: 13

A	B	C	D	E	FX
38,46	0,0	46,15	7,69	7,69	0,0

Lecturers: doc. RNDr. Martin Gera, PhD.

Last change: 14.03.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTV/2-MXX-115/17	Sports in Natur (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: 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. 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: 83

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

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.

Last change: 16.06.2022
Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTV/2-MXX-116/18	Sports in Natur (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: 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: 50

A	B	C	D	E	FX
94,0	0,0	0,0	0,0	0,0	6,0

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:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/2-FTL-107/15	Structure and Mechanical Properties of Solids

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: 8

Recommended semester: 1.

Educational level: II.

Prerequisites:

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

Learning outcomes:
The course provides deeper insight into the structure of a broad spectrum of forms of condensed matter, from ideal crystals to defective crystals to quasicrystals to liquid crystals to liquids and amorphous structures. Besides description of structure we focus on understanding of relations between structure, energy and entropy.

Class syllabus:
Thermodynamic potentials and phase diagrams
Lattice vibrations in harmonic approximation - dynamical matrix, phonons
Anharmonic effects in crystals - thermal expansion
Quasicrystals and incommensurate structures
Defects in crystals - point defects, dislocations
Order/disorder transition in alloys
Structure of surfaces - reconstruction
Mechanical properties of solids - strain and stress tensors, elastic constants in crystals, plasticity, fracture
Structure of liquids, glasses and amorphous solids
Soft matter
Polymers and their properties
Liquid crystals, isotropic-nematic transition, Frederiks transition
2D systems - graphene

Recommended literature:
Solid state physics / Neil W. Ashcroft, N. David Mermin. Fort Worth : Harcourt Brace, 1976

Úvod do fyziky pevných látek / Charles Kittel ; přeložili Miloš Matyáš ... [et al.]. Praha : Academia, 1985
Condensed matter physics : Corrected printing / Michael P. Marder. New York : John Wiley, 2000

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 46

A	B	C	D	E	FX
65,22	10,87	10,87	6,52	6,52	0,0

Lecturers: prof. Ing. Roman Martoňák, DrSc., Mgr. Ondrej Tóth, PhD.

Last change: 19.01.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FMK-102/00	Synoptic Meteorology (2)

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

Number of credits: 5

Recommended semester: 1.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
The atmospheric fronts classification. Slope of a front. The peculiarities of baric field and pressure tendency field in fronts area. The characteristics and peculiarities of simple and composite fronts. The frontogenesis and the frontolysis. The orography influence upon fronts. The cyclones and anticyclones in temperate geographic zones and their types. Cyclogenesis and anticyclogenesis. Characteristics of cyclones and anticyclones in various phases of development. The remove and regeneration of pressure systems. The orography influence upon pressure systems. General circulation. The models, fundamental laws and some problems of general circulation. Typing of synoptic situations. The principles compiling forecast.

Recommended literature:
Zverev, A.S.: Synoptická meteorológia. Alfa, Bratislava, 1986, 712s.
Bluestein, H.B.: Synoptic-Dynamic Meteorology in Midlatitudes, Vol. 2. Oxford, Univ.Press 1993, 594 pp.
Reuter, H.: Die Wettervorhersage. Springer Verlag, Wien, 1976, 208 s.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 37

A	B	C	D	E	FX
37,84	8,11	18,92	13,51	18,92	2,7

Lecturers: RNDr. Martin Benko, PhD., Mgr. Miroslav Šinger, PhD.

Last change: 20.12.2021

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FMK-103/00	Synoptic Meteorology Practice (2)

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

Number of credits: 4

Recommended semester: 1.

Educational level: II.

Prerequisites: FMFI.KAFZM/2-FMK-117/22 - Synoptic Meteorology Practice (1)

Course requirements:
Preliminary evaluation: activity, performance of assigned tasks
Final exam: written
Indicative evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 30/70

Learning outcomes:
Special practice as a practical part of the course Synoptic meteorology (2). The aim of the course is to deepen the knowledge acquired in the lecture by applying knowledge in current situations. Students will be able to identify the properties of atmospheric fronts and air masses, properties and stages of development of pressure systems and locations of the frontal zone. Students will be able to describe the synoptic situation and estimate its probable development for weather forecasts.

Class syllabus:
Manual determination of the position and type of atmospheric fronts based on the analysis of real synoptic maps. In the second phase, the transition to the analysis of synoptic maps using numerical weather prediction models, which will allow students to combine several parameters (observation, radar and satellite measurements, outputs from numerical models) on horizontal and vertical sections of the troposphere. As a result, they will gain a more comprehensive idea of the current synoptic situation, as a result of which they will be able to better understand and interconnect the acquired theoretical knowledge. In the final phase of the course, the compilation of weather forecasts using numerical forecasting models.

Recommended literature:
Bluestein, H. B., 1993: Synoptic-Dynamic Meteorology in Midlatitudes. Vol. I, II, Oxford University Press.
Návod k sestavování kódovaných zpráv, Vyd.ČHMÚ, Praha, 1981, 138s.
Zverev, A.S, 1986: Synoptická meteorológia. Alfa, Bratislava, 712 s.
Internet resources recommended by the teacher.

Languages necessary to complete the course:

Slovak in combination with English (some of the suggested readings are in English)

Notes:

Past grade distribution
Total number of evaluated students: 72

A	B	C	D	E	FX
75,0	16,67	5,56	2,78	0,0	0,0

Lecturers: RNDr. Martin Benko, PhD., Mgr. Miroslav Šinger, PhD.

Last change: 15.03.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/2-FMK-104/00	Synoptic Meteorology Practice (3)

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

Number of credits: 4

Recommended semester: 2.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
Analyze of actual synoptic charts including atmospheric fronts localization. Evaluation and description of synoptic situation and attempt to forecast its evolution.
Forecasting materials used by forecasters, used formulation and sequences.
Preparing of weather forecast for next day.
Forecasting materials on the Internet.

Recommended literature:
Zverev, A.S.: Synoptická meteorológia. Alfa, Bratislava, 1986, 712 s
Bluestein, H.B.: Synoptic-Dynamic Meteorology in Midlatitudes, Vol.2. Oxford, Univ.Press, 1993, 594 pp.
For the exercises are used materials of SHMI (data about weather, outputs from numerical weather prediction models ALADIN, ARPEGE, GM-DWD, data from meteorological satellites and radars, etc.)

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 36

A	B	C	D	E	FX
86,11	13,89	0,0	0,0	0,0	0,0

Lecturers: Mgr. Miroslav Šinger, PhD.

Last change: 02.06.2015

Approved by: