Course descriptions

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COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-803/10	**Course title:** BSc Thesis Supervision
Educational activities: **Type of activities:** **Number of hours:** **per week: per level/semester:** **Form of the course:** on-site learning	
Number of credits: 10	
Recommended semester:	
Educational level: III.	
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	

ABS	NEABS
0,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-501/10	**Course title:** Completion of PhD Research Project Stage
Educational activities: **Type of activities:** **Number of hours:** **per week: per level/semester:** **Form of the course:** on-site learning	
Number of credits: 10	
Recommended semester:	
Educational level: III.	
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	

ABS	NEABS
0,0	0,0

Lecturers:
Last change:
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-806/10	**Course title:** Creation of Teaching Texts and Aids
Educational activities: **Type of activities:** **Number of hours:** **per week:** **per level/semester:** **Form of the course:** on-site learning	
Number of credits: 6	
Recommended semester:	
Educational level: III.	
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	

ABS	NEABS
0,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-809/10	**Course title:** Diploma Thesis Guidance
Educational activities: **Type of activities:** **Number of hours:** **per week:** **per level/semester:** **Form of the course:** on-site learning	
Number of credits: 4	
Recommended semester:	
Educational level: III.	
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	

ABS	NEABS
0,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by:

STATE EXAM DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-990/15	**Course title:** Dissertation Thesis Defense
Number of credits: 30	
Recommended semester: 7., 8..	
Educational level: III.	
State exam syllabus:	
Last change: 02.06.2015	
Approved by:	

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FGF-015/00	Efficient Numerical Methods of Seismic Wave Propagation

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 3.

Educational level: III.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
Solution to the equation of motion of the viscoelastic continuum with a realistic attenuation for structurally complex models. Models of the whole Earth, regional models, local models. Boundary, domain and hybrid methods. The finite-difference, finite-element, spectral-element, boundary-element, finite-volume, discrete-wavenumber, and hybrid methods. Application of the methods to wave propagation and rupture propagation problems.

Recommended literature:
K. Aki, P.G. Richards: Quantitative seismology – Theory and methods I, II. W.H. Freeman 1980
O.C. Zienkiewicz, R.L. Taylor: The finite element method. McGraw-Hill 1989
G.C. Cohen: Higher-order numerical methods for transient wave equations. Springer 2002
P. Moczo: Introduction to modeling seismic wave propagation by the finite-difference method. Kyoto University 1988.
B.L.N. Kennett: The seismic wavefield I and II. Cambridge University Press 2001 a 2002.
J.M. Carcione: Wave field in real media: Wave propagation in anisotropic, anelastic and porous media. Pergamon 2001
selected articles in Geophysics, Bull. Seism. Soc. Am., Geophys. J. Int., J. Geophys. Res., Wave Motion

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 1

ABS	NEABS
100,0	0,0

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

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-301/10	**Course title:** Foreign Periodical Cited in Current Contents
Educational activities: **Type of activities:** **Number of hours:** **per week: per level/semester:** **Form of the course:** on-site learning	
Number of credits: 35	
Recommended semester:	
Educational level: III.	
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

ABS	NEABS
0,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-303/10	**Course title:** Foreign Periodical not Cited in Current Contents
Educational activities: **Type of activities:** **Number of hours:** **per week: per level/semester:** **Form of the course:** on-site learning	
Number of credits: 20	
Recommended semester:	
Educational level: III.	
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	

ABS	NEABS
0,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAMŠ/3-FGF-004/00	Geodynamics and Thermodynamics of the Earth's Mantle

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 2.

Educational level: III.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
Heat transfer in the mantle. The cooling of the Earth. The cooling of the Earth's core as a source of small-scale modes of mantle convection. Hot spots. The heat transferred by plumes. The matter transported by plumes. Dynamics and the shape of mantle plumes. The cooling of oceanic lithosphere as a source of large-scale modes of convection. Plate tectonics, the role of lithosphere. The influence of plates on the mantle convection. An effect of phase transitions in mantle transition zone. The mantle as a dynamic system. The problem of layering of mantle convection. The geochemical properties of mantle. The history of the Earth's mantle.

Recommended literature:
G.F. Davies: Dynamic Earth. Cambridge University Press 1999
D.L. Turcotte, G. Schubert: Geodynamics. Cambridge University Press 2002
G. Schubert, D.L. Turcotte, P. Olson: Mantle Convection in the Earth and Planets. Cambridge University Press 2001

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 0

ABS	NEABS
0,0	0,0

Lecturers: doc. RNDr. Ján Boďa, CSc.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FGF-008/00	Geomagnetism

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 2.

Educational level: III.

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: 0

ABS	NEABS
0,0	0,0

Lecturers: RNDr. Adriena Ondrášková, PhD., doc. RNDr. Sebastián Ševčík, CSc.

Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-804/15	**Course title:** Guidance of a Project for the Students´ Conference
Educational activities: **Type of activities:** **Number of hours:** **per week: per level/semester:** **Form of the course:** on-site learning	
Number of credits: 7	
Recommended semester:	
Educational level: III.	
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	

ABS	NEABS
0,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-302/10	**Course title:** Home Journal Cited in Current Contents
Educational activities: **Type of activities:** **Number of hours:** **per week:** **per level/semester:** **Form of the course:** on-site learning	
Number of credits: 25	
Recommended semester:	
Educational level: III.	
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	

ABS	NEABS
0,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-304/10	**Course title:** Home Journal not Cited in Current Contents
Educational activities: **Type of activities:** **Number of hours:** **per week: per level/semester:** **Form of the course:** on-site learning	
Number of credits: 12	
Recommended semester:	
Educational level: III.	
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	

ABS	NEABS
0,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-703/10	**Course title:** Home Project Co-researcher
Educational activities: **Type of activities:** **Number of hours:** **per week: per level/semester:** **Form of the course:** on-site learning	
Number of credits: 10	
Recommended semester:	
Educational level: III.	
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	
ABS	NEABS
0,0	0,0
Lecturers:	
Last change: 02.06.2015	
Approved by:	

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-006/00	**Course title:** Hydrodynamics
Educational activities: **Type of activities:** lecture **Number of hours:** **per week:** 2 **per level/semester:** 28 **Form of the course:** on-site learning	
Number of credits: 5	
Recommended semester: 2.	
Educational level: III.	
Prerequisites:	
Course requirements:	
Learning outcomes:	
Class syllabus: Physical properties of the fluids. Kinematics of flows. Governing equations for fluid flows. Hydrostatics. Flow of homogeneous incompressible fluid. Flow with small Reynolds number. Theory of potential flow and its applications. Flow with high Reynolds number. Boundary layers. The flow of effectively inviscid fluid with vorticity. Motion of the vortex. Hydrodynamic stability. Transition to the turbulence.	
Recommended literature: G.K. Batchelor: An Introduction to Fluid Mechanics. Cambridge University Press 2001 M. Van Dyke: An Album of Fluid Motion. Parabolic Press 1982 R.P. Feynman: Feynman Lectures, vol. II. Addison–Wesley Publishing Company 1964	
Languages necessary to complete the course:	
Notes:	
Past grade distribution Total number of evaluated students: 0	
ABS	NEABS
0,0	0,0
Lecturers: doc. RNDr. Peter Guba, PhD.	
Last change: 02.06.2015	
Approved by:	

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-104/10	**Course title:** Individual Study of Science and Research Resources (1)
Educational activities: **Type of activities:** **Number of hours:** **per week: per level/semester:** **Form of the course:** on-site learning	
Number of credits: 5	
Recommended semester: 1.	
Educational level: III.	
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	
ABS	NEABS
0,0	0,0
Lecturers:	
Last change: 02.06.2015	
Approved by:	

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-105/10	**Course title:** Individual Study of Science and Research Resources (2)
Educational activities: **Type of activities:** **Number of hours:** **per week: per level/semester:** **Form of the course:** on-site learning	
Number of credits: 5	
Recommended semester: 2.	
Educational level: III.	
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	

ABS	NEABS
0,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-106/10	**Course title:** Individual Study of Science and Research Resources (3)
Educational activities: **Type of activities:** **Number of hours:** **per week: per level/semester:** **Form of the course:** on-site learning	
Number of credits: 5	
Recommended semester: 3.	
Educational level: III.	
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	

ABS	NEABS
100,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-107/10	**Course title:** Individual Study of Science and Research Resources (4)
Educational activities: **Type of activities:** **Number of hours:** **per week: per level/semester:** **Form of the course:** on-site learning	
Number of credits: 5	
Recommended semester: 4.	
Educational level: III.	
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	

ABS	NEABS
0,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-702/10	**Course title:** International Project Co-researcher
Educational activities: **Type of activities:** **Number of hours:** **per week: per level/semester:** **Form of the course:** on-site learning	
Number of credits: 15	
Recommended semester:	
Educational level: III.	
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	

ABS	NEABS
0,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FGF-011/00	Magnetohydrodynamics

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 3.

Educational level: III.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
Governing MHD equations, Boussinesq and anelastic approximation, density stratification and conditions for convection arising. Toroidal and poloidal vectors, free decay modes. Dimensionless parameters, scaling. Nondiffusive waves, an influence of diffusion on MHD waves. Boundary layers (Ekman's, Hartmann's, Stewartson's). Magnetoconvection in rotating systems, linear stability theory. Stationary convection and overstable instabilities. Model of horizontal rotating layer, studies of stability in cylindrical and spherical shells. MAC and MC waves. Finite amplitude convection, nonlinear stability theory. Mean field MHD.
Driving mechanisms for convection and dynamo. Kinematic dynamos and antidynamo rules. (-effect and (-effect, ((-dynamo, strong field dynamos, weak field dynamos, dynamo number, Taylor constraint, Taylor state. Z-dynamo. Models of computational dynamos, selfconsistent selfexiced dynamo. Numerical implementation and methods of solving. Reversals and their governing and controlling mechanisms.

Recommended literature:
J. A. Jacobs: Geomagnetism, Vol. 2. Academic Press 1987
H. K. Moffatt: Magnetic field generation in electrically conducting fluids. Cambridge University Press 1978
P. H. Roberts: An Introduction to Magnetohydrodynamics. Longman 1967
S. Chandrasekhar: Hydrodynamic and hydromagnetic stability. Clarendon Press 1961
Selected papers in Phys. Earth Planet. Int., Geophys. Astrophys. Fluid Dyn.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 0

ABS	NEABS
0,0	0,0

Lecturers: doc. RNDr. Sebastián Ševčík, CSc.
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FGF-102/00	Mathematical Methods in Geophysics

Educational activities:
Type of activities: lecture
Number of hours:
per week: 3 **per level/semester:** 42
Form of the course: on-site learning

Number of credits: 8

Recommended semester: 1.

Educational level: III.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
The equations of mathematical physics (in geophysics) – partial differential equations and the methods to solve them. The methods of potential theory, the Green functions method. Qualitative analysis of ordinary differential equations. Application of integral transforms (in mathematical physics and in the data and signal processing…). The methods of signal processing – linear, non-linear, statistical approaches, wavelet transform and analysis. The method of boundary integral equations. Perturbation and asymptotic methods – their application in solving of nonlinear equations (algebraic, differential). Numerical methods – finite difference method, boundary element method, spectral method. Interpolation and approximation.

Recommended literature:
T. Rikitake, R. Sato, Y. Hagiwara: Applied Mathematics for Earth Scientists. Kluwer 1987
M. Abramowitz, I.A. Stegun: Handbook of mathematical functions. National Bureau of Standards, Applied Mathematics Series, 1964
V.J. Arsenin: Matematická fyzika, Alfa 1977 (in Slovak)
M. Hvoždara, M. Gajdošová (R. Pašteka): Matematické základy teórie geofyzikálnych metód I (II), Lecture notes PriFUK 1998 (2000) (in Slovak)
A. Ralston: Základy numerické matematiky, Academia 1973
A.H. Nayfeh: Introduction to Perturbation Techniques, J. Wiley 1981
A.H. Nayfeh, B.Balachandran: Applied Nonlinear Dynamics, J. Wiley 1995
P. Glendinning: Stability, Instability and Chaos. Cambridge University Press 1994
A. Angot: Užitá matematika pro elektrotechnické inženýry. SNTL 1971, (in Czech)
P.M. Morse, H. Feshbach: Methods of Theoretical Physics. McGraw-Hill 1953
H. Jeffreys, B. Swirles: Methods of Mathematical Physics. Cambridge University Press 1966

Languages necessary to complete the course:

Notes:

Past grade distribution Total number of evaluated students: 0	
ABS	NEABS
0,0	0,0
Lecturers: doc. Mgr. Jozef Kristek, PhD.	
Last change: 02.06.2015	
Approved by:	

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-701/10	**Course title:** Obtaining a University Grant
Educational activities: **Type of activities:** **Number of hours:** **per week: per level/semester:** **Form of the course:** on-site learning	
Number of credits: 20	
Recommended semester:	
Educational level: III.	
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	

ABS	NEABS
0,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-805/10	**Course title:** Participation in a Conference Organising Committee
Educational activities: **Type of activities:** **Number of hours:** **per week: per level/semester:** **Form of the course:** on-site learning	
Number of credits: 3	
Recommended semester:	
Educational level: III.	
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	

ABS	NEABS
0,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by:

STATE EXAM DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-950/15	**Course title:** Passing Dissertation Examination
Number of credits: 20	
Recommended semester: 3., 4..	
Educational level: III.	
State exam syllabus:	
Last change: 02.06.2015	
Approved by:	

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FGF-016/00	Physical Principles and Probabilistic Methods of Seismic Hazard Analysis

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 3.

Educational level: III.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
Seismoactive fault, structure of an active source zone, time-space regime of a source zone, long-term processes of earthquake preparation, processes on a fault, elements of seismic hazard assessment, parameterization of an seismoactive fault and a source zone with respect to the probabilistic models of earthquake occurrence, characteristics of seismic hazard, seismotectonic model, epistemic and aleatoric uncertainties of source zone parameters, attenuation for seismic hazard characteristics, logic tree of seismic hazard parameters – scenarios of seismic hazard, probabilistic computation of seismic hazard characteristics, de-aggregation of seismic hazard computation

Recommended literature:
R.K. McGuire: The practice of earthquake hazard assessment. IASPEI/ESC 1993
L. Reiter: Earthquake hazard analysis. Issues and insights.Columbia University Presss 1990
C.A. Cornell: Engineering seismic risk analysis. Bull. Seism. Soc. Am. 58,1538-1606,1968
K.W. Campbell: Near-source attenuation of peak horizontal acceleration. Bull. Seism. Soc. Am.71, 2039-2070, 1981
D.L. Wells, K.J. Coppersmith: New empirical relationships among magnitude, rupture length, rupture width, rupure area, and surface displacement. Bull. Seism. Soc. Am. 84, 974-1002,1994
S.-C. Wu et al: A hybrid recurrence model and its implication on seismic hazard results. Bull. Seism. Soc. Am. 85, 1-16,1995
the whole No: Seism. Res. Lett. 68, No. 1, 1997
selected papers in Bull. Seism. Soc. Am., J. Geophys. Res., J. European Engng., Nat. Haz.

Languages necessary to complete the course:

Notes:

Past grade distribution Total number of evaluated students: 1	
ABS	NEABS
100,0	0,0
Lecturers: doc. Mgr. Jozef Kristek, PhD.	
Last change: 02.06.2015	
Approved by:	

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FGF-014/00	Physics of Processes in Seismoactive Zone

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 2.

Educational level: III.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
Tectonic activity of the lithosphere, stresses in the lithosphere, cohesion, internal friction, Coulomb criterion, Anderson's fault theory, fault population, structure and rheology of the fault zone, thermodynamics of the fault zone, aseismic motions.
Fault surface, initial stress. Initialization of the rupture, modes of rupture propagation, spontaneous rupture propagation and boundary conditions on the fault surface.
Friction – microscopic and macroscopic views. Results of laboratory tests. Frictions laws and rupture propagation on the fault. Healing of rupture. Energy budget of the rupture initialization and propagation. Seismic efficiency. Effects of the initial stress, material heterogeneity and geometry of the fault surface. Effect of the pore pressure. Frictional heating. Small and large earthquakes in terms of rupture propagation and seismic efficiency.

Recommended literature:
Ch. H. Scholz: The mechanics of earthquakes and faulting. Cambridge Univ. Press 2002
B.V. Kostrov, S. Das: Principles of earthquake source mechanics. Cambridge Univ. Press 1988
J.R. Rice: The mechanics of earthquake rupture. North-Holland 1980
J. Koyama: The complex faulting process of earthquakes. Kluwer 1997.
R. Teisseyre (ed.): Continuum theories in solid earth physics. Elsevier 1986
L.B. Freund: Dynamic fracture mechanics. Cambridge Univ. Press 1998
B. Lawn: Fracture of brittle solids. Cambridge Univ. Press 1998
selected articles in Bull. Seism. Soc. Am., J. Geophys. Res., Geophys. J. Int., Rev. Geophysics

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 0

ABS	NEABS
0,0	0,0

Lecturers: prof. RNDr. Peter Moczo, DrSc.
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FGF-101/00	Physics of the Earth's Interior

Educational activities:
Type of activities: lecture
Number of hours:
per week: 3 **per level/semester:** 42
Form of the course: on-site learning

Number of credits: 8

Recommended semester: 1.

Educational level: III.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
Structure of the Earth, discontinuities and their character, rheological properties of mantle, viscosity of the mantle, radial and lateral mantle inhomogeneities and their identification by seismic and gravimetric methods, geoid, geochemical reservoirs, mantle convection, discussion about present views, models of convection, tectonics of lithospheric plates, rheological constraints for the origin of lithospheric plates, mantle plumes, their origin and history, thermal boundary layers. Origin of shallow and deep earthquakes. Composition of liquid core, the cooling of the Earth, mechanisms of convection in the core, energetic balance and heat flow, thermal and compositional convection, processes of solidification in the core, physical properties and motion of inner solid core. Integrated view on mutual relationships, on time scales of processes and constraints on the dynamic properties of the mantle and core. Core-mantle mechanical and electromagnetic coupling, mutual relationships between processes in the core and mantle and motions of the Earth’s body as a planet.

Recommended literature:
G. Schubert, D.L. Turcotte, P. Olson: Mantle Convection in the Earth and Planets. Cambridge Univ. Press 2001
D.L. Anderson: Theory of the Earth. Blackwell Scientific Publications 1989
I. Jackson: The Earth’s Mantle. Cambridge University Press 2000
W.R. Peltier: Mantle Convection. Plate Tectonics and Global Dynamics. Gordon and Breach Science Publishers 1989
K.C. Condi: Mantle Plumes and Their Record in Earth History. Cambridge University Press 2001

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 0

ABS	NEABS
0,0	0,0

Lecturers: doc. RNDr. Sebastián Ševčík, CSc.
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-404/10	**Course title:** Presentation at a Department Seminar
Educational activities: **Type of activities:** **Number of hours:** **per week:** **per level/semester:** **Form of the course:** on-site learning	
Number of credits: 5	
Recommended semester:	
Educational level: III.	
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	

ABS	NEABS
0,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-403/10	**Course title:** Presentation at a Home Conference
Educational activities: **Type of activities:** **Number of hours:** **per week: per level/semester:** **Form of the course:** on-site learning	
Number of credits: 10	
Recommended semester:	
Educational level: III.	
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	

ABS	NEABS
0,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-402/10	**Course title:** Presentation at a Home Conference with International Participation
Educational activities: **Type of activities:** **Number of hours:** **per week:** **per level/semester:** **Form of the course:** on-site learning	
Number of credits: 15	
Recommended semester:	
Educational level: III.	
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	

ABS	NEABS
0,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-401/10	**Course title:** Presentation at an International Conference
Educational activities: **Type of activities:** **Number of hours:** **per week:** **per level/semester:** **Form of the course:** on-site learning	
Number of credits: 20	
Recommended semester:	
Educational level: III.	
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	

ABS	NEABS
0,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-704/10	**Course title:** Quotation Registered in SCI or SCOPUS
Educational activities: **Type of activities:** **Number of hours:** **per week: per level/semester:** **Form of the course:** on-site learning	
Number of credits: 4	
Recommended semester:	
Educational level: III.	
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	

ABS	NEABS
0,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-707/10	**Course title:** Quotation in a Home Scientific Journal
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:	
Educational level: III.	
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	

ABS	NEABS
0,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-705/10	**Course title:** Quotation in a Monograph
Educational activities: **Type of activities:** **Number of hours:** **per week: per level/semester:** **Form of the course:** on-site learning	
Number of credits: 4	
Recommended semester:	
Educational level: III.	
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	

ABS	NEABS
0,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-706/10	**Course title:** Quotation in a Scientific Journal Abroad
Educational activities: **Type of activities:** **Number of hours:** **per week: per level/semester:** **Form of the course:** on-site learning	
Number of credits: 3	
Recommended semester:	
Educational level: III.	
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	

ABS	NEABS
0,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-305/10	**Course title:** Reviewed Foreign Papers Volume
Educational activities: **Type of activities:** **Number of hours:** **per week: per level/semester:** **Form of the course:** on-site learning	
Number of credits: 25	
Recommended semester:	
Educational level: III.	
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	

ABS	NEABS
0,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-306/10	**Course title:** Reviewed Home Papers Volume
Educational activities: **Type of activities:** **Number of hours:** **per week: per level/semester:** **Form of the course:** on-site learning	
Number of credits: 15	
Recommended semester:	
Educational level: III.	
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	

ABS	NEABS
0,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FGF-013/00	Seismic Signal and Image Analysis

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 2.

Educational level: III.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
Time-frequency analysis, Heisenberg-Gabor uncertainty principle, windows Fourier transform, continuous wavelet transform, marginal distributions (Wigner-Ville) for real seismic signals and their discrete versions, adaptive pursuit methods-orthogonal/non-orthogonal matching pursuit. Discrete wavelet transform, definition of multi-resolution analysis (MRA). Approximation spaces, scaling function, and the dilation equation, detail spaces. Mother wavelet and the wavelet equation. A view from the frequency domain. Orthogonal wavelets, Daubechies wavelets, Daubechies' least asymmetric filters, coiflets, biorthogonal wavelets. Local trigonometric bases and transforms - discrete sine and cosine transforms. Wavelet packet transform (WPT) and local sine and cosine packet transform. Shift-invariant wavelet transform (MODWT) and WPT's algorithms for pattern recognition. Image segmentation, signal detection and edge identification in seismic signals and images.
Wavelet threshold and noise reduction, the minimum squared error threshold. General cross validation (GCV) methods and their applicability for seismic signals. The Bayesian approach for denoising signals and images. Wavelet packet and best basis methods for compression of seismic signals.
Algorithms and methods for identification and clustering methods in automated identification of seismic phases, phase and group delay, polarization analysis, locally earthquakes effects.

Recommended literature:
S. Mallat: A Wavelet Tour of Signal Processing. Academic Press 1999
P. Flandrin: Time-Frequency / Time-Scale Analysis. Academic Press 1999
R. Carmona, W.L. Hwang, B. Torésani: Practical Time-Frequency Analysis. Academic Press 1998
R.C. Gonzales, R.E. Woods: Digital Image Processing. Addison-Wesley Publishing Co. 1993

Languages necessary to complete the course:

Notes:

Past grade distribution Total number of evaluated students: 0	
ABS	NEABS
0,0	0,0
Lecturers: prof. RNDr. Peter Moczo, DrSc.	
Last change: 02.06.2015	
Approved by:	

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FGF-009/00	Selected Chapters from Ionospheric and Magnetospheric Physics

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 2.

Educational level: III.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
Dynamics of middle atmosphere, QBO, NAO, ENSO, ionization, interaction of solar radiation with neutral atmosphere. Chemical processes in the lower ionosphere. Variations of solar activity and their influence on changes in ionosphere and middle atmosphere. Earth's magnetosphere and selected processes, solar wind interaction with magnetosphere. Time and space structure of wave processes in magnetosphere, non-linear character of geomagnetic pulsations development, resonance phenomena. Energy transfer. Processes in magnetosphere on micro- and macro scales, processes of self-organisation and synergism. Fractal dimensions and chaos, scaling. Turbulence. Intermittence and coherence. Non-linear analysis of time series. Method of neuron networks. Cosmic weather. Space satellite research. Propagation of electromagnetic waves along the curved surface and between the surface and ionosphere, eigenmodes of Earth-ionosphere resonator. Schumann resonances. Observatory measurements, analysis and processing of time records and interpretation.

Recommended literature:
W. Baumjohann, R.A. Treumann: Basic space plasma physics. Imperial College Press 1996
H.M. Hastings, G. Sugihara: Fractals: a Users Guide for the Natural Scientists.
Oxford University Press 1993
M.G. Kivelson, Ch.T. Russel: Introduction to space physics. Cambridge University Press 1995
J. Galejs: Terrestrial propagation of long electromagnetic waves. Pergamon Press 1972
J. R. Wait: Electromagnetic waves in stratified media. Pergamon Press 1962
Selected articles from J.Geophys. Res., Planet. Space Sci., Geophys. Res. Lett., Nonl. Proc.Geophys.

Languages necessary to complete the course:

Notes:

Past grade distribution Total number of evaluated students: 0	
ABS	NEABS
0,0	0,0
Lecturers: RNDr. Adriena Ondrášková, PhD., doc. RNDr. Sebastián Ševčík, CSc.	
Last change: 02.06.2015	
Approved by:	

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FGF-103/00	Selected Experimental and Observational Methods in Geophysics

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 1 / 2 **per level/semester:** 14 / 28
Form of the course: on-site learning

Number of credits: 8

Recommended semester: 2.

Educational level: III.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
Physical principles of geophysical measurement systems in gravimetry, seismology, geomagnetism, paleomagnetism and electromagnetic sounding. Sensors, calibration, analog-digital conversion, time marks and synchronization, DCF and GPS time marks. Precision and sensitivity of apparatus. Absolute and relative measurements, data acquisition by computer, international rules, requirements and standards for data formatting and archivation. Data postprocessing, transfer of data to the local, regional and international collecting centers.
Protection of analog and digital data lines against overvoltages and their attendant problems in geophysical observatories. Disturbances, noise and electromagnetic smog. Elimination of antropogeneous influences by electronic and/or computational postprocessing, digital filtration. The selection of a locality for continual and temporary measurements, the analysis of a suitable locality for recording.

Recommended literature:
Selected articles in the geophysical journals.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 0

ABS	NEABS
0,0	0,0

Lecturers: doc. Mgr. Jozef Kristek, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FGF-007/00	Seminar on Geodynamics

Educational activities:
Type of activities: seminar
Number of hours:
per week: 3 **per level/semester:** 42
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 4.

Educational level: III.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
The specification of most important problems of integrated research of geodynamic processes by gravimetric, seismic, geothermal methods, and by electromagnetic sounding. The revaluation of present structure models of the crust, lithosphere and asthenosphere in region of Pannonian Basin. Critical analysis of recent state of the models and proposals of new approaches. New possibilities of mathematical modeling of lithospheric slabs dynamics, implementation of rheological properties into models. Interpretational methods, a discussion about them, searching of new approaches for Carpathian-Pannonian geological-geodynamic unit.

Recommended literature:
J. Geophys. Res., Geophys. J. Int., Tectonophysics, Phys. Earth Planet. Int., J. Geodynamics

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 0

ABS	NEABS
0,0	0,0

Lecturers: doc. RNDr. Sebastián Ševčík, CSc.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FGF-012/00	Seminar on Geomagnetism

Educational activities:
Type of activities: seminar
Number of hours:
per week: 3 **per level/semester:** 42
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 4.

Educational level: III.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
The study of basic papers. The selection and presentation of significant recent problems in geomagnetism, in the theory of hydromagnetic processes in cosmic objects with emphasis on the liquid Earth's core. Further, the presentation of problems in the physics of ionosphere and magnetosphere, electromagnetic sounding and the Schumann resonances investigation. The presentation of applied methods, the analysis and development of new approaches in the solved problems in Slovakia as well as the problems solved in frame of the international cooperation.

Recommended literature:
J. Geophys. Res., Geophys. J. Int., Phys. Earth Planet. Int., Geophys. Astrophys. Fluid Dyn., J. Fluid Mech., J. Atmos. Solar Terrestrial Phys.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 0

ABS	NEABS
0,0	0,0

Lecturers: RNDr. Adriena Ondrášková, PhD., doc. RNDr. Sebastián Ševčík, CSc.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FGF-017/00	Seminar on Seismology

Educational activities:
Type of activities: seminar
Number of hours:
per week: 3 **per level/semester:** 42
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 4.

Educational level: III.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
Outline of the most important unsolved problems of physics of earthquakes and structural seismology. More detailed explanation of the selected problems and the effort to solve them. Consideration of relations between the problems and new possible approaches to solve them.
Problems elaborated in Slovakia and within the international cooperation. Considerations of new approaches.

Recommended literature:
Rev. Geophysics, Bull. Seism. Soc. Am., J. Geophys. Res., Geophys. J. Int.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 0

ABS	NEABS
0,0	0,0

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

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-005/00	**Course title:** Structure and Dynamics of Lithosphere
Educational activities: **Type of activities:** lecture **Number of hours:** **per week:** 2 **per level/semester:** 28 **Form of the course:** on-site learning	
Number of credits: 5	
Recommended semester: 3.	
Educational level: III.	
Prerequisites:	
Course requirements:	
Learning outcomes:	
Class syllabus: Definition of lithosphere, lithosphere and asthenosphere, the structure of lithosphere, the difference between continental and oceanic lithosphere. Seismic, density and geothermal models of lithosphere. Inhomogeneities of lithosphere and asthenosphere. Rheological properties of lithosphere, the prediction counting of lithosphere rheology, stress in lithosphere, viscosity of lithosphere. Three dimensional structure of lithosphere and asthenosphere, seismic tomography, anisotropy of lithosphere and asthenosphere. Convergent and divergent plate borders, geophysical mapping of subducted lithospheric slabs, rheology of subducted plates. Positive anomalies of seismic velocities – possible image of subducted lithospheric plates. Isostasy (local and regional) in lithosphere, numerical computing of isostasy. Deformation of lithosphere, the elastic plate theory, flexure of lithosphere. The integrated geophysical modeling of the structure and geodynamics of lithosphere. Mutual relationships and interactions between lithosphere and asthenosphere, mutual connections among processes taking place in lithosphere, Earth's crust and asthenosphere.	
Recommended literature: D.L. Turcotte, G. Schubert: Geodynamics – Applications of Continuum Physics to Geological problems. John Wiley&Sons 1985 R. J. Lillie: Whole Earth Geophysics. Prentice Hall 1998 G. Schubert, D.L. Turcotte, P. Olson: Mantle Convection in the Earth and Planets. Cambridge University Press 2001 G.F. Davies: Dynamic Earth: Plates, Plumes and Mantle Convection. Cambridge University Press 1999	
Languages necessary to complete the course:	
Notes:	

Past grade distribution Total number of evaluated students: 0	
ABS	NEABS
0,0	0,0
Lecturers: doc. RNDr. Miroslav Bielik, DrSc.	
Last change: 02.06.2015	
Approved by:	

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-807/10	**Course title:** Study Stay Abroad
Educational activities: **Type of activities:** **Number of hours:** **per week: per level/semester:** **Form of the course:** on-site learning	
Number of credits: 3	
Recommended semester:	
Educational level: III.	
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	

ABS	NEABS
0,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-801/10	**Course title:** Supervising and Demonstrating Work
Educational activities: **Type of activities:** **Number of hours:** **per week: per level/semester:** **Form of the course:** on-site learning	
Number of credits: 5	
Recommended semester:	
Educational level: III.	
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	

ABS	NEABS
100,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-802/10	**Course title:** Supervising and Demonstrating Work
Educational activities: **Type of activities:** **Number of hours:** **per week: per level/semester:** **Form of the course:** on-site learning	
Number of credits: 5	
Recommended semester:	
Educational level: III.	
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	
ABS	NEABS
0,0	0,0
Lecturers:	
Last change: 02.06.2015	
Approved by:	

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FGF-808/10	**Course title:** Writing Diploma Thesis Assessment Protocol
Educational activities: **Type of activities:** **Number of hours:** **per week: per level/semester:** **Form of the course:** on-site learning	
Number of credits: 4	
Recommended semester:	
Educational level: III.	
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	

ABS	NEABS
0,0	0,0

Lecturers:
Last change: 02.06.2015
Approved by: