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COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-010/22	Algebraic Geometry

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: 7

Recommended semester: 3.

Educational level: III.

Prerequisites:

Course requirements:
Homeworks (written solutions of problems and their consulting 50%), final exam (oral exam with written preparation 50%). Rough evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): Homeworks / Final evaluation: 50/50

Learning outcomes:
PhD. student masters basic notions and methods of modern algebraic geometry in order to read contemporary literature in the area.

Class syllabus:
Affine schemes and their basic constructions. Techniques of global schemes.

Recommended literature:
1. S. Bosch: Algebraic Geometry and Commutative Algebra, Springer, 2013
2. D. Eisenbud: Commutative algebra with a view toward algebraic geometry. New York: Springer,2004
3. D. Eisenbud, J. Harris: The Geometry of Schemes, Springer, 2000
4. U. Görtz, T. Wedhorn: Algebraic Geometry I: Schemes, Springer, 2020

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 0

ABS	NEABS
0,0	0,0

Lecturers: doc. RNDr. Pavel Chalmovianský, PhD.

Last change: 22.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/2-MAT-223/09	Algebraic Topology

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:

Educational level: II., III.

Prerequisites:

Course requirements:
Exam: written and oral
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%

Learning outcomes:
Subject aim: to acquaint students with basic ideas, methods and some applications of algebraic topology.

Class syllabus:
The problem of homeomorphy. Constructions of new topological spaces by forming quotient spaces. Attaching a cell to a topological space. Surfaces and topological manifolds. Path-connectedness. Homotopy. Fundamental group. Basic homology theory. Homology groups of spheres and their applications. Cohomology groups, cohomology ring, and applications.

Recommended literature:
A. Hatcher, Algebraic Topology. Cambridge University Press 2002
A. Kriegl, Algebraic Topology. Lecture Notes. University of Vienna, Vienna 2008, accessible at http://www.mat.univie.ac.at/~kriegl/Skripten/alg-top.pdf
W. Massey, A Basic Course in Algebraic Topology. Springer-Verlag, New York 1991
E. Spanier, Algebraic Topology. Springer-Verlag, New York 1995

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 43

A	ABS	B	C	D	E	FX	NEABS
55,81	0,0	23,26	9,3	6,98	4,65	0,0	0,0

Lecturers: doc. Mgr. Tibor Macko, PhD.

Last change: 21.06.2022
Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-012/00	Algebraic Topology (1)

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: 10

Recommended semester: 1.

Educational level: III.

Prerequisites:

Course requirements:
Exam: written and oral
Indicative evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%

Learning outcomes:
This is a follow-up to the master course in algebraic topology, an elaboration of homology and cohomology theories at advanced levels.

Class syllabus:
Homology and cohomology theories, the universal coefficient theorems and Kuenneth fomulae, products, Steenrod cohomology operations, duality.

Recommended literature:
Topology and geometry / Glen E. Bredon. New York : Springer, 1993
Algebraic topology / Edwin H. Spanier. New York : Springer, 1966
Algebraic topology / Allen Hatcher. New York : Cambridge University Press, 2001

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 2

ABS	NEABS
100,0	0,0

Lecturers: doc. Mgr. Tibor Macko, PhD.

Last change: 21.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-013/00	Algebraic Topology (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: 7

Recommended semester: 2.

Educational level: III.

Prerequisites:

Course requirements:
Exam: written and oral
Indicative evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%

Learning outcomes:
Elaboration of higher homotopy theory and basic facts from theory of spectral sequences.

Class syllabus:
Higher homotopy groups, the Hurewicz homomorphism, homotopy properties of CW-complexes, homology and cohomology spectral sequences of fibrations and their applications.

Recommended literature:
Topology and geometry / Glen E. Bredon. New York : Springer, 1993
Algebraic topology / Edwin H. Spanier. New York : Springer, 1966
Algebraic topology / Allen Hatcher. New York : Cambridge University Press, 2001

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 2

ABS	NEABS
100,0	0,0

Lecturers: doc. Mgr. Tibor Macko, PhD.

Last change: 21.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-803/10	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:
The PhD-student supervises a BSc diploma thesis.

Class syllabus:
Preparations. Supervision of a BSc (undergraduate) diploma thesis.

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: doc. RNDr. Pavel Chalmovianský, PhD.

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAMŠ/2-MAT-123/15	Calculus of Variations

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

Number of credits: 6

Recommended semester:

Educational level: II., III.

Prerequisites:

Course requirements:
Preliminary grading: homeworks.
Exam: written and oral.
Grading: A 90%, B 80%, C 70%, D 60%, E 50%.
Scale of assessment (preliminary/final): 20/80

Learning outcomes:
The students will learn to differentiate variational integrals and related Nemytskii mappings, they will be able to verify necessary and sufficient conditions guaranteeing the existence of global and local extrema of particular functionals, to find extrema in the case of one-dimensional integrals and find out, whether these extrema are weak or strong.

Class syllabus:
Differentiability of the Nemytskii mapping, basic existence theorem for global extrema, necessary and sufficient conditions for local extrema,
constrained extrema, the Euler and Jacobi equations, necessary and sufficient conditions for strong and weak extrema of one-dimensional integrals, investigation of critical points of particular functionals.

Recommended literature:
B. Dacorogna: Direct methods in the calculus of variations, Springer, Berlin - Heidelberg 2008.
M. Struwe: Variational methods, Springer, Berlin - Heidelberg 2008.
J.L. Troutman: Variational calculus and Optimal Control, Springer, New York 1996.
G. Buttazzo, M. Giaquinta, S. Hildebrandt: One-dimensional variational problems, Clarendon Press, Oxford 1998.

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 10

A	ABS	B	C	D	E	FX	NEABS
60,0	0,0	20,0	0,0	10,0	0,0	10,0	0,0

Lecturers: prof. RNDr. Pavol Quittner, DrSc.

Last change: 19.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-301/10	Category A Publication

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:
Examination 0%

Learning outcomes:
A publication on the top interational level, in a journal (conference proceedings) covered by the database WoK or SCOPUS; in internationally renowned congress (conference) proceedings published by IFAC, covered in SCOPUS; a monograph or a chapter in monograph published by an internationally renowned publishing house (Elsevier, Springer). The number of credits will be 0.P times 35 if the student's participation on the publication is P%

Class syllabus:
Achieving new scientific results in the area of student's PhD study. Writing a scientific manuscript and its publication.

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: doc. RNDr. Andrej Ferko, PhD., doc. RNDr. Pavel Chalmovianský, PhD., doc. Mgr. Tibor Macko, PhD.

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-302/10	Category B Publication

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:
A publication in a journal covered by Mathematical Reviews, Zentralblatt MATH, Referativnyi Zhurnal, INSPEC; in fully peer reviewed proceedings of an international conference held in an international language, with a large international participation, reviewed by title in Mathematical Reviews, Zentralblatt MATH, Referativnyi Zhurnal; in proceedings of an internationally renowned organization (IFAC) or publisher (Springer, Elsevier) if it is not of category A; a monograph or a chapter in monograph in an international language published by an international publisher if it is not of category A. The number of credits will be 0.P times 25 if the student's participation on the publication is P%.

Class syllabus:
Achieving new scientific results in the area of student's PhD study. Writing a scientific manuscript and its publication.

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: doc. RNDr. Andrej Ferko, PhD., doc. RNDr. Pavel Chalmovianský, PhD., doc. Mgr. Tibor Macko, PhD.

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-303/10	Category C Publication

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:
A publication reviewed, but not by title, in Mathematical Reviews, ZbMATH, Referativnyi Zhurnal; in peer reviewed proceedings of an international conference with an international organizing committee, if it is not of categories A or B; a monograph or a chapter in monograph published by a Slovak publishing house in an international language, exceptionally also in Slovak, reviewed in Mathematical Reviews, ZbMATH, Referativnyi Zhurnal, if it contains new original results by the student. The number of credits will be 0.P times 20 if the student's participation on the publication is P%.

Class syllabus:
Achieving new scientific results in the area of student's PhD study. Writing a scientific manuscript and its publication.

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: doc. RNDr. Andrej Ferko, PhD., doc. RNDr. Pavel Chalmovianský, PhD., doc. Mgr. Tibor Macko, PhD.

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-304/10	Category D Publication

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:
A scientific publication by the student that cannot be classified as of type A, B, or C. The number of credits will be 0.P times 10 if the student's participation on the publication is P%.

Class syllabus:
Achieving new scientific results in the area of student's PhD study. Writing a scientific manuscript and its publication.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 2

ABS	NEABS
100,0	0,0

Lecturers: doc. RNDr. Andrej Ferko, PhD., doc. RNDr. Pavel Chalmovianský, PhD., doc. Mgr. Tibor Macko, PhD.

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-031/10	Category Theory

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: 7

Recommended semester: 3.

Educational level: III.

Prerequisites:

Course requirements:
Exam: written and oral
Indicative evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%

Learning outcomes:
To master selected category-theoretical methods used in topology and algebra.

Class syllabus:
Abstract and concrete categories and functors, adjoint functors, existence of adjoints, reflective and coreflective subcategories, factorization structures, topological categories and functors, selected topical themes.

Recommended literature:
Categories for the working mathematician / Saunders Mac Lane. New York : Springer, 1997
Algebra a príbuzné disciplíny / Milan Kolibiar ...[et al.]. Bratislava : Alfa, 1992
Abstract and Concrete Categories/Jiří Adámek, Horst Herrlich, George E. Strecker. http://katmat.math.uni-bremen.de/acc/acc.pdf

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. Tibor Macko, PhD.

Last change: 21.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/2-MAT-617/09	Category Theory (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:

Educational level: II., III.

Prerequisites:

Course requirements:
Continuous assessment: homework and 1 presentation
Indicative evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Students will master selected basic concepts and methods of category theory and will be able to apply them in topology and algebra.

Class syllabus:
Categories, functors and natural transformations. Special morphisms and objects. Subcategories. Limits and colimits. Factorization systems.

Recommended literature:
Algebra a príbuzné disciplíny / Milan Kolibiar ...[et al.]. Bratislava : Alfa, 1992
Categories for the working mathematician / Saunders Mac Lane. New York : Springer, 1997
Abstract and Concrete Categories/Jiří Adámek, Horst Herrlich, George E. Strecker. http://katmat.math.uni-bremen.de/acc/acc.pdf

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 29

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

Lecturers: doc. Mgr. Tibor Macko, PhD.

Last change: 21.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/2-MAT-622/09	Category Theory (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:

Educational level: II., III.

Prerequisites:

Course requirements:
Continuous assessment: homework and 1 presentation
Indicative evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Students will master selected basic concepts and methods of category theory and will be able to apply them in topology and algebra.

Class syllabus:
Adjoint functors, existence theorems, reflective and coreflective subcategories. Generators and cogenerators of categories and subcategories. Application of category theory methods in topology and algebra.

Recommended literature:
Algebra a príbuzné disciplíny / Milan Kolibiar ...[et al.]. Bratislava : Alfa, 1992
Categories for the working mathematician / Saunders Mac Lane. New York : Springer, 1997
Abstract and Concrete Categories/Jiří Adámek, Horst Herrlich, George E. Strecker. http://katmat.math.uni-bremen.de/acc/acc.pdf

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 13

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

Lecturers: doc. Mgr. Tibor Macko, PhD.

Last change: 21.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-023/10	Classical Differential Geometry

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: 7

Recommended semester: 2.

Educational level: III.

Prerequisites:

Course requirements:
Final exam (oral exam with written preparation 100%). Rough evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%

Learning outcomes:
The PhD students master important notions, methods and results of the classical differential geometry of curves and surfaces. They will be able to apply their knowledge to problems in geometry and topology.

Class syllabus:
Curves: Analytic expression. Tangent lines and osculating planes. Natural parametrization. Curvature and torsion, the Frenet formulas. Natural equations of curves.
Surfaces: Analytic expression. Curves on surfaces. Tangent planes and normals. Developable surfaces. The first fundamental form of a surface. Mappings between surfaces. The second fundamental form of a surface. The normal curvature of a surface. Directions on a surface. Principal directions and principal curvatures. The Gaussian curvature of a surface.
Geometry on surfaces: Geodesics, geodetic coordinates. Surfaces with constant curvature. Non-euclidean geometry.

Recommended literature:
A comprehensive introduction to differential geometry : volume 1 / Michael Spivak. Berkeley : Publish or Perish, 1979
A comprehensive introduction to differential geometry : Volume 2 / Michael Spivak. Berkeley : Publish or Perish, 1979
A comprehensive introduction to differential geometry : Volume 3 / Michael Spivak. Berkeley : Publish or Perish, 1979
A comprehensive introduction to differential geometry : Volume 4 / Michael Spivak. Berkeley : Publish or Perish, 1979
A comprehensive introduction to differential geometry : Volume 5 / Michael Spivak. Berkeley : Publish or Perish, 1979

Lectures on classical differential geometry / Dirk J. Struik. Cambridge : Addison-Wesley Press, 1950

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 4

ABS	NEABS
100,0	0,0

Lecturers: doc. RNDr. Pavel Chalmovianský, PhD.

Last change: 22.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-008/22	Commutative Algebra

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: 10

Recommended semester: 1.

Educational level: III.

Prerequisites:

Course requirements:
Homeworks (written solutions of problems and their consulting 50%), final exam (oral exam with written preparation 50%). Rough evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): Homeworks/ final exam: 50/50

Learning outcomes:
PhD. student masters selected methods of modern commutative algebra with emphasis on application in other areas, especially in algebraic geometry.

Class syllabus:
Commutatiove rings and modules. Theory of noetherian rings. Integral extensions of rings. Extensions and restrictions of coefficients. Homological methods: Ext and Tor.

Recommended literature:
1. S. Bosch: Algebraic Geometry and Commutative Algebra, Springer, 2013
2. M. F. Atiyah, I. G. MacDonald: Introduction to commutative algebra: Advanced book program.Oxford : Westview, 1969
3. D. Eisenbud: Commutative algebra with a view toward algebraic geometry. New York: Springer,2004
4. H.Matsumura: Commutative Ring Theory, Cambridge University Press, Cambridge, 1989

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 0

ABS	NEABS
0,0	0,0

Lecturers: doc. RNDr. Pavel Chalmovianský, PhD., doc. RNDr. Martin Mačaj, PhD.

Last change: 22.06.2022
Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-503/10	Completion of Defined Stage of PhD Research Project (1)

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: 5.

Educational level: III.

Prerequisites:

Course requirements:

Learning outcomes:
The student completes the corresponding part of the research related to the dissertation and achieves original results.

Class syllabus:
Scientific research and elaboration of the results in a written form.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 7

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-504/10	Completion of Defined Stage of PhD Research Project (2)

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: 6.

Educational level: III.

Prerequisites:

Course requirements:

Learning outcomes:
The student completes the corresponding part of the research related to the dissertation and achieves original results.

Class syllabus:
Scientific research and elaboration of the results in a written form.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 5

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-505/10	Completion of Defined Stage of PhD Research Project (3)

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: 7.

Educational level: III.

Prerequisites:

Course requirements:

Learning outcomes:
The student completes the corresponding part of the research related to the dissertation and achieves original results.

Class syllabus:
Scientific research and elaboration of the results in written form.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 5

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAG/3-MGT-002/00	**Course title:** Constructive Applied Geometry
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: 7	
Recommended semester: 4.	
Educational level: III.	
Prerequisites:	
Course requirements: Final exam (oral exam with written preparation 100%). Rough evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%	
Learning outcomes: The aim of this lecture, based on principles and methods of the traditional geometry and the computational synthetic geometry, is to deepen the knowledge of the students useful in technical applications of geometry and machine vision. The lecture will also supply the necessary geometric basis for the theory of computer vision and image recognition. The students will also find inspiration for creating new algorithms or improving effectiveness of the traditional algorithms in computer graphics.	
Class syllabus: Synthetic constructions of curves, surfaces and solids for technical applications. Viewing methods and traditional methods of the realistic imaging (illumination, shadowing, isophotes). The use of computers and professional software in constructions and photo-realistic imaging. Geometric photogrammetry and its use in creating virtual cities. Single view geometry and camera models. Mathematical and geometric principles of multiple view geometries. Two-view and epipolar geometry. Projections used in cartography or related fields.	
Recommended literature: R. Hartley, A Zisserman: Multiple View Geometry, Cambridge University Press 2002 O. Faugeras, Q – T. Luong (T. Papadopoulo) Geometry of Multiple Images, The MIT Press, Cambridge, Massachusetts, London 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. Pavel Chalmovianský, PhD.	
Last change: 22.06.2022	
Approved by:	

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-024/10	Contemporary Geometric Modeling

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: 10

Recommended semester: 1.

Educational level: III.

Prerequisites:

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

Learning outcomes:
The students are supposed to acquire modern trends in parameteric, implicit and subdivision modeling of curves, surfaces and volumes. They should be able to solve tasks connected with constructive modelling requirements of technical praxis as well as contemporary problems of modeling in computer graphics, entertainment industry and mass media.

Class syllabus:
Mathematical methods in geometric modeling. Extended methods in paramteric modeling (Coons body construction, bodies as special hypersurfaces in E4). Geometric modeling using splines, especially in rational form. Recursive subdivision and refinement in modeling. Fundamentals of implicit modeling of curves and surfaces. F-rep. Implicitization. Selected elimination methods. Polar forms. Shape modification tools and fitting. Mesh in geometric modeling. Effective methods of tesselation for smooth surfaces and boundaries.

Recommended literature:
Solid modeling by computers : From theory to applications / edited Mary S. Pickett, John W. Boyse. New York : Plenum Press, 1984
Level set methods and dynamic implicit surfaces / Stanley Osher, Ronald Fedkiw. New York : Springer, 2003
Michael Mortenson : Geometric Modeling. John Wiley & Sons, Inc. New York, NY, 3rd Edition 2006

Languages necessary to complete the course:

Notes:

Past grade distribution Total number of evaluated students: 1	
ABS	NEABS
100,0	0,0
Lecturers: doc. RNDr. Pavel Chalmovianský, PhD.	
Last change: 22.06.2022	
Approved by:	

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/3-MXX-101/15	Course of English for PhD Studies (1)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning, distance 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: 200

A	ABS	B	C	D	E	FX	NEABS
42,0	53,5	0,5	0,0	0,0	2,0	0,0	2,0

Lecturers: PhDr. Alena Zemanová, Mgr. Simona Tomášková, PhD.

Last change: 20.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/3-MXX-102/15	Course of English for PhD Studies (1)

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

Number of credits: 5

Recommended semester: 2.

Educational level: III.

Prerequisites: FMFI.KJP/3-MXX-101/15 - Course of English for PhD Studies (1)

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 193

A	ABS	B	C	D	E	FX	NEABS
45,6	48,7	0,0	0,0	0,0	0,0	0,0	5,7

Lecturers: PhDr. Alena Zemanová, Mgr. Simona Tomášková, PhD.

Last change: 20.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-806/10	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:
The student produces a new teaching aid or text.

Class syllabus:
Preparations for producing a new teaching aid or text. Production of a new teaching aid or text.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 2

ABS	NEABS
50,0	50,0

Lecturers: doc. RNDr. Pavel Chalmovianský, PhD.

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-203/10	Department Seminar

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: 5

Recommended semester:

Educational level: III.

Prerequisites:

Course requirements:
The seminar talk.

Learning outcomes:
The student will be able to give a public talk about their own or other scientific theories and concrete results, as well as to react to questions and criticisms.

Class syllabus:
Seminar talks on selected topics of contemporary geometry and topology.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 2

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-709/10	Development of Novel Software Product Linked with PhD Project

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:
The student develops an original software product related to the topic of the dissertation thesis.

Class syllabus:
Preparations; completion and documentation of a new software product related to the topic of the dissertation thesis.

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: doc. RNDr. Andrej Ferko, PhD., doc. RNDr. Pavel Chalmovianský, PhD., doc. Mgr. Tibor Macko, PhD.

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/2-MAT-214/09	Differential Topology

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: 4

Recommended semester:

Educational level: II., III.

Prerequisites:

Course requirements:
Exam: written and oral
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%

Learning outcomes:
Subject aim: to acquaint students with basic ideas, methods and some applications of differential topology.

Class syllabus:
A review of selected basic notions of general topology. Differentiable manifolds and differentiable maps. Tangent vector space. The differential of a differentiable map at a point. Tangent bundles. Submanifolds. Immersions and embeddings of manifolds. Inverse Function Theorem and its corollaries; transversality. Regular and critical points, regular and critical values, Sard's Theorem. Proof of the fundamental theorem of algebra.

Recommended literature:
M. Hirsch, Differential Topology. Springer-Verlag, New York 1976.
J. Milnor, Topology from the Differential Viewpoint, The Univ. Press of Virginia, Charlottesville 1965.
I. Singer, J. Thorpe, Lecture Notes on Elementary Topology and Geometry, Scott, Foresman and Co., Glenview, Illinois 1967.
F. Warner, Foundations of Differentiable Manifolds and Lie Groups. Springer-Verlag, Berlin 1983.

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 47

A	ABS	B	C	D	E	FX	NEABS
61,7	2,13	8,51	17,02	2,13	4,26	4,26	0,0

Lecturers: doc. Mgr. Tibor Macko, PhD.

Last change: 21.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-014/00	Differential Topology

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: 7

Recommended semester: 4.

Educational level: III.

Prerequisites:

Course requirements:
Exam: written and oral
Indicative evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%

Learning outcomes:
An elaboration of the advanced theory of smooth manifolds and vector bundles.

Class syllabus:
The Morse-Sard theorem, transversality, vector bundles, immersions and embeddings of manifolds in Euclidean spaces, the degree of a map, the Euler characteristic, basic facts from Morse theory.

Recommended literature:
Topology and geometry / Glen E. Bredon. New York : Springer, 1993
Differential topology / Morris W. Hirsch. New York : Springer, 1997

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 2

ABS	NEABS
100,0	0,0

Lecturers: doc. Mgr. Tibor Macko, PhD.

Last change: 21.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-809/10	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:
The student assists, in a verifiable manner, a colleague directing a Master Thesis.

Class syllabus:
Preparations for the assistance. Performing the assistance.

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: doc. RNDr. Pavel Chalmovianský, PhD.

Last change: 03.09.2015

Approved by:

STATE EXAM DESCRIPTION

Academic year: 2022/2023	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAG/3-MGT-950/15	**Course title:** Dissertation Examination
Number of credits: 20	
Educational level: III.	
Course requirements: State examination.	
Learning outcomes: By completing this subject, the student fulfils a necessary condition for finishing the learning period and beginning the research period of the study.	
Class syllabus: Written part and oral part of the state exam.	
State exam syllabus:	
Last change: 03.09.2015	
Approved by:	

STATE EXAM DESCRIPTION

Academic year: 2022/2023	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAG/3-MGT-990/15	**Course title:** Dissertation Thesis Defense
Number of credits: 30	
Educational level: III.	
Course requirements: State examination.	
Learning outcomes: The student defends originality and scientific value of the results presented in the dissertation thesis.	
Class syllabus: Preparations for the defense. Defense of the dissertation thesis.	
State exam syllabus:	
Last change: 03.09.2015	
Approved by:	

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-021/10	Fundamentals of Geometry

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: 7

Recommended semester: 1.

Educational level: III.

Prerequisites:

Course requirements:
Examination (A: 90%, B: 80%, C: 70%, D: 60% , E:50%)

Learning outcomes:
The PhD students learn some interesting but little known properties of geometric planar and spatial objects, as well as the fundamental principles and methods in the axiomatic approach to classical geometry related to some geometric and algebraic structures and formation of non-euclidean geometries. They will be then able to use the knowledge obtained to solve problems in geometry and topology.

Class syllabus:
Geometric incidence structures, projective and affine planes. Coordinatization of projective and affine planes and the relations between geometric and corresponding coordinate algebraic structures. Finite geometries and geometries over the field. Ordered geometry. Absolute geometry as the starting point for introduction of hyperbolic non-euclidean geometry. Riemann's non-euclidean geometry. Fundamental principles for construction of four-dimensional geometry. Selected chapters of Euclidean geometry (special properties of triangle, isometries and similarities in Euclidean plane and space, two-dimensional crystallography, geometry of circles and spheres, Platonic solids, golden section, phyllotaxis).

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 4

ABS	NEABS
100,0	0,0

Lecturers: doc. Mgr. Tibor Macko, PhD., doc. RNDr. Štefan Solčan, CSc., RNDr. Jana Chalmovianská, PhD.

Last change: 03.09.2015
Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/2-MAT-211/15	General Topology

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: 5

Recommended semester:

Educational level: II., III.

Prerequisites:

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

Learning outcomes:
Students will understand basic notions of general topology, properties of topological spaces and their subsets, basic topological constructions. They will be able to apply topological results in further areas of mathematical analysis, topology and geometry.

Class syllabus:
Topological spaces and continuous functions. Basic topological constructions (subspace, topological sum and product, quotient space).
Countability axioms and separation axioms (Hausdorff, regular, completely regular and normal spaces). Connected and linearly connected spaces. Compact and locally compact spaces. Metric space, metrizable spaces.

Recommended literature:
General topology / Stephen Willard. Mineola : Dover, 1970
Topology / James R. Munkres. Upper Saddle River : Prentice-Hall , 2000

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 17

A	ABS	B	C	D	E	FX	NEABS
70,59	0,0	23,53	0,0	0,0	0,0	5,88	0,0

Lecturers: RNDr. Martin Sleziak, PhD., doc. Mgr. Tibor Macko, PhD.

Last change: 18.06.2022
Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-030/10	General Topology

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: 10

Recommended semester: 1.

Educational level: III.

Prerequisites:

Course requirements:
Exam: written and oral
Indicative evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%

Learning outcomes:
To master selected notions and methods of general topology and their applications in geometry and topology, mathematical analysis and algebra.

Class syllabus:
Compact spaces and compactifications, compactly generated spaces, perfect mappings, paracompact spaces, topologies on sets of continuous mappings, compact - open topology, metrizable spaces, metrization theorems, uniform spaces, selected topical themes.

Recommended literature:
General topology / Stephen Willard. Mineola : Dover, 1970
Topology / James R. Munkres. Upper Saddle River : Prentice-Hall , 2000
Modern general topology / Jun-Iti Nagata. Amsterdam : North-Holland, 1968

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. Tibor Macko, PhD., doc. RNDr. Jaroslav Guričan, CSc.

Last change: 21.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-016/00	Global Differential Geometry

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: 7

Recommended semester: 2.

Educational level: III.

Prerequisites:

Course requirements:
Final exam (oral exam with written preparation 100%). Rough evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%

Learning outcomes:
The students will master basic ideas and results of the global differential geometry of manifolds.

Class syllabus:
Differentiable manifolds, smooth mappings, tangent vectors. Tensors and tensor fields. Covariant derivative, affine connection. Geodesics. Riemannian metric, the Levi-Civita connection. Homogeneous spaces, invariant connections.

Recommended literature:
Foundations of differential geometry : Volume 2 / Shoshichi Kobayashi, Katsumi Nomizu. New York : John Wiley, 1969
A comprehensive introduction to differential geometry : volume 1 / Michael Spivak. Berkeley : Publish or Perish, 1979
A comprehensive introduction to differential geometry : Volume 2 / Michael Spivak. Berkeley : Publish or Perish, 1979
A comprehensive introduction to differential geometry : Volume 3 / Michael Spivak. Berkeley : Publish or Perish, 1979
A comprehensive introduction to differential geometry : Volume 4 / Michael Spivak. Berkeley : Publish or Perish, 1979
A comprehensive introduction to differential geometry : Volume 5 / Michael Spivak. Berkeley : Publish or Perish, 1979
Kobayashi, S., Nomizu, K.: Foundations of Differential Geometry I. Interscience Publishers N. York, 1996.

Languages necessary to complete the course:

Notes:

Past grade distribution Total number of evaluated students: 3	
ABS	NEABS
100,0	0,0
Lecturers: doc. RNDr. Pavel Chalmovianský, PhD.	
Last change: 22.06.2022	
Approved by:	

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-804/10	Guidance of a Project Presented at 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: 10

Recommended semester:

Educational level: III.

Prerequisites:

Course requirements:

Learning outcomes:
The PhD-student supervises writing and submitting a paper for the Students‘ Conference.

Class syllabus:
Preparations. Supervision of a student.

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: doc. RNDr. Pavel Chalmovianský, PhD.

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-703/10	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:
The student becomes a member of a research team supported by a Slovak grant agency.

Class syllabus:
Participation in preparations for a grant project. Membership in a research team supported by a Slovak grant agency.

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: doc. RNDr. Andrej Ferko, PhD., doc. RNDr. Pavel Chalmovianský, PhD., doc. Mgr. Tibor Macko, PhD.

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-101/10	Individual Study of Science and Research Resources (1)

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: 1.

Educational level: III.

Prerequisites:

Course requirements:
Examination (A: 90%, B: 80%, C: 70%, D: 60% , E:50%)

Learning outcomes:
The student masters the subject of individual study and is able to apply the knowledge obtained in solving open questions of geometry and topology.

Class syllabus:
An active individual study of the literature (mostly a monograph or its selected parts) prescribed by the individual plan of study.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 6

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-102/10	Individual Study of Science and Research Resources (2)

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: 2.

Educational level: III.

Prerequisites:

Course requirements:
Examination (A: 90%, B: 80%, C: 70%, D: 60% , E:50%)

Learning outcomes:
The student masters the subject of individual study and is able to apply the knowledge obtained in solving open questions of geometry and topology.

Class syllabus:
An active individual study of the literature (mostly a monograph or its selected parts) prescribed by the individual plan of study.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 5

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-103/10	Individual Study of Science and Research Resources (3)

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: 3.

Educational level: III.

Prerequisites:

Course requirements:

Learning outcomes:
The student masters the subject of individual study and is able to apply the knowledge obtained in solving open questions of geometry and topology.

Class syllabus:
An active individual study of the literature (mostly a monograph or its selected parts) prescribed by the individual plan of study.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 7

ABS	NEABS
85,71	14,29

Lecturers:

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-104/10	Individual Study of Science and Research Resources (4)

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: III.

Prerequisites:

Course requirements:
Examination (A: 90%, B: 80%, C: 70%, D: 60% , E:50%)

Learning outcomes:
The student masters the subject of individual study and is able to apply the knowledge obtained in solving open questions of geometry and topology.

Class syllabus:
An active individual study of the literature (mostly a monograph or its selected parts) prescribed by the individual plan of study.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 3

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-702/10	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:
The student becomes a member of an international research team supported by a grant agency.

Class syllabus:
Participation in preparations for a grant project. Membership in an international research team supported by a grant agency.

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: doc. RNDr. Andrej Ferko, PhD., doc. RNDr. Pavel Chalmovianský, PhD., doc. Mgr. Tibor Macko, PhD.

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-708/10	Introduction of Novel Experimental Method Linked with PhD Project

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:
The student introduces an experimental method of new kind, related to the topic of the dissertation.

Class syllabus:
Preparations. Indroduction of a novel experimental method in relation to the topic of the dissertation.

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: doc. RNDr. Andrej Ferko, PhD., doc. RNDr. Pavel Chalmovianský, PhD., doc. Mgr. Tibor Macko, PhD.

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-018/10	Introduction to Symplectic Topology

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: 7

Recommended semester: 4.

Educational level: III.

Prerequisites:

Course requirements:
Exam: written and/or oral exam
Indicative grading scheme: A: 90%, B: 80%, C: 70%, D: 60% , E:50%
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
Students will master classical results, as well as selected outcomes of the current research in symplectic topology, topological applications of gauge theories etc.

Class syllabus:
The contents of the course will be adjusted, to some extent, to the interests of the students. The topics covered in the course will include mainly the following:
basic notions, methods and results of symplectic topology, tools and analytical background of theory of J-holomorphic curves, the Gromov-Witten invariants, applications of the gauge theory in the topology of 3-dimensional and 4-dimensional manifolds.

Recommended literature:
Symplectic geometry, grupoids, and integrable systems / Pierre Dazord, Alan Weinstein. New York : Springer, 1991
Algebraic topology / Edwin H. Spanier. New York : Springer, 1966
Introduction to Symplectic Topology / Dusa McDuff, Dietmar Salamon: Oxford Science Publications, 1998

Languages necessary to complete the course:
English, Slovak

Notes:

Past grade distribution
Total number of evaluated students: 0

ABS	NEABS
0,0	0,0

Lecturers: Mgr. Martin Niepel, PhD., doc. Mgr. Tibor Macko, PhD.
Last change: 15.03.2022
Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-015/00	Lie Groups and Algebras

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: 7

Recommended semester: 4.

Educational level: III.

Prerequisites:

Course requirements:
Exam: written and/or oral examin
Indicative grading scheme: A: 90%, B: 80%, C: 70%, D: 60% , E:50%
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
Students will learn the basic concepts, methods and results of the theory of Lie groups and algebras and will be able to apply them in solving problems in geometry and topology.

Class syllabus:
The notion of Lie group, examples. The action of a Lie group on a manifold. Homogeneous spaces. Classical Lie groups. Invariant vector fields. Basic information on representations. Fundamentals of the theory of Lie algebras.

Recommended literature:
Topology and geometry / Glen E. Bredon. New York : Springer, 1993
Diferenciálna geometria a Lieove grupy pre fyzikov / Marián Fecko. Bratislava : Iris, 2004
Differential geometry and Lie groups for physicists / Marián Fecko. Cambridge : Cambridge University Press, 2006
Carter, Roger, Segal, Graeme, and MacDonald, Ian, Lectures on Lie Groups and Lie Algebras, Cambridge University Press, 1995.

Languages necessary to complete the course:
English, Slovak

Notes:

Past grade distribution
Total number of evaluated students: 3

ABS	NEABS
100,0	0,0

Lecturers: Mgr. Martin Niepel, PhD., doc. Mgr. Tibor Macko, PhD.

Last change: 15.03.2022
Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-026/10	Machine Vision and Image Processing

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: 7

Recommended semester: 3.

Educational level: III.

Prerequisites:

Course requirements:
individual work
Examination 100% (A: 90%, B: 80%, C: 70%, D: 60% , E:50%)

Learning outcomes:
The PhD students receive an overview of recent advanced methods in computer vision, which reflect the current state of knowledge in the field (preprocessing, segmentation, image recognition and understanding), with an emphasis on the most challenging ideas in 3D vision. They will be able to apply the acquired knowledge in solving theoretical and practical problems of computer vision.

Class syllabus:
1. Digital image and its properties (overview)
2. The image preprocessing (advanced method)
3. Segmentation (advanced method)
4. Pattern recognition (advanced method)
5. Image understanding
6. 3D vision, geometry and radiometry
7. Uses of 3D vision
8. Motion Analysis
9. Case studies (selected topics)

Recommended literature:
Image processing, analysis, and machine vision / Milan Sonka, Vaclav Hlavac, Roger Boyle. [Stamford] : Cengage Learning, 2008
Počítačové videnie / Elena Šikudová, Zuzana Černeková, Wanda Benešová, Zuzana Haladová, Júlia Kučerová. Praha: Wikina 2013.
https://vgg.fiit.stuba.sk/kniha/Pocitacove%20Videnie%20-%20Detekcia%20a%20Rozpoznavanie%20Objektov.pdf
Study materials in Slovak and selected recent papers and monographs in Visual Computing research.

Languages necessary to complete the course:

Notes:	
Past grade distribution Total number of evaluated students: 2	
ABS	NEABS
50,0	50,0
Lecturers: doc. RNDr. Andrej Ferko, PhD.	
Last change: 30.11.2021	
Approved by:	

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KMANM/2-MAT-122/15	Nonlinear Functional Analysis

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

Number of credits: 5

Recommended semester:

Educational level: II., III.

Prerequisites:

Course requirements:
Continuous assessment: handwriting
Exam: oral
Original rating scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 40/60

Learning outcomes:
Fundamentals of nonlinear analysis, differential calculus in Banach spaces, bifurcation theory and continuous methods.

Class syllabus:
1. Differential calculus in Banach spaces.
2. Local nonlinear analysis: Uniform contraction theorem and implicit function theorem.
3. Bifurcation theory: Lyapunov - Schmidt reduction.
4. Continuous methods for solving nonlinear equations.

Recommended literature:
Lectures on nonlinear analysis / Pavel Drábek, Jaroslav Milota. Plzeň : Vydavateľstvo servis, 2004
Nonlinear differential equations and dynamical systems / Ferdinand Verhulst. Berlin : Springer, 1990
Nelineární diferenciální rovnice / Svatopluk Fučík, Alois Kufner. Praha : Státní nakladatelství technické literatury, 1978

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 13

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

Lecturers: prof. RNDr. Michal Fečkan, DrSc.

Last change: 12.03.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-701/10	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:
The student gets a grant from Comenius University in Bratislava.

Class syllabus:
Preparations for a grant project. Getting a grant.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 5

ABS	NEABS
100,0	0,0

Lecturers: doc. RNDr. Andrej Ferko, PhD., doc. RNDr. Pavel Chalmovianský, PhD., doc. Mgr. Tibor Macko, PhD.

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-805/10	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:
The student demonstrates organizational capabilities in co-organising a scientific conference as a member of its organising committee.

Class syllabus:
Preparations. Work in the organising committee of a scientific conference.

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: doc. RNDr. Pavel Chalmovianský, PhD.

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-404/10	Presentation at a Department Seminar on Science

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:
Talk at seminar

Learning outcomes:
The student proves to be able to present mathematical results to an expert audience and to discuss the topic presented in the talk.

Class syllabus:
Individual research activity of the student. Preparations for a public presentation of the results . Delivery of a talk.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 12

ABS	NEABS
100,0	0,0

Lecturers: doc. RNDr. Andrej Ferko, PhD., doc. RNDr. Pavel Chalmovianský, PhD., doc. Mgr. Tibor Macko, PhD.

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-403/10	Presentation at a Home Conference without 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: 7

Recommended semester:

Educational level: III.

Prerequisites:

Course requirements:

Learning outcomes:
The students are able to deliver a lecture about results of their own scientific research at a conference with no foreign participants.

Class syllabus:
Preparations for a lecture or talk. Delivery of a lecture or talk at a scientific conference.

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: doc. RNDr. Andrej Ferko, PhD., doc. RNDr. Pavel Chalmovianský, PhD., doc. Mgr. Tibor Macko, PhD.

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-402/10	Presentation at a Home Scientific 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:
The students are able to deliver a lecture about results of their own scientific research at a conference in Slovakia with domestic and foreign participants.

Class syllabus:
Preparations for a lecture or talk. Delivery of a lecture or talk at a scientific conference.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 3

ABS	NEABS
100,0	0,0

Lecturers: doc. RNDr. Andrej Ferko, PhD., doc. RNDr. Pavel Chalmovianský, PhD., doc. Mgr. Tibor Macko, PhD.

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-401/10	Presentation at a Scientific Conference or Academic Scientific Seminar Abroad

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:
The students are able to deliver a lecture or talk about results of their own scientific research abroad, at a conference or university scientific seminar.

Class syllabus:
Preparations for a lecture or talk. Delivery of a lecture or talk at a scientific conference or seminar.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 3

ABS	NEABS
100,0	0,0

Lecturers: doc. RNDr. Andrej Ferko, PhD., doc. RNDr. Pavel Chalmovianský, PhD., doc. Mgr. Tibor Macko, PhD.

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-704/15	Quotation Registered in WoK 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:
A scientific work of the student is cited in a publication covered by Web of Knowledge or SCOPUS (autocitations are excluded).

Class syllabus:
Finding and recording a citation of the specified type.

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: doc. RNDr. Andrej Ferko, PhD., doc. RNDr. Pavel Chalmovianský, PhD., doc. Mgr. Tibor Macko, PhD.

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-706/10	Quotation in Work with at Least One Foreign Author

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:
A scientific work of the student is cited in a publication with at least one foreign author (autocitations are excluded).

Class syllabus:
Finding and recording a citation of the specified type.

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: doc. RNDr. Andrej Ferko, PhD., doc. RNDr. Pavel Chalmovianský, PhD., doc. Mgr. Tibor Macko, PhD.

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-707/10	Quotation in Work with no Foreign Author

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:
A scientific work of the student is cited in a publication without foreign authors (autocitations are excluded).

Class syllabus:
Finding and recording a citation of the specified type.

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: doc. RNDr. Andrej Ferko, PhD., doc. RNDr. Pavel Chalmovianský, PhD., doc. Mgr. Tibor Macko, PhD.

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-705/10	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:
A scientific work of the student is cited in a monograph (auto-citations are excluded).

Class syllabus:
Finding and recording a citation of the specified type.

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: doc. RNDr. Andrej Ferko, PhD., doc. RNDr. Pavel Chalmovianský, PhD., doc. Mgr. Tibor Macko, PhD.

Last change: 22.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-032/15	Real Algebraic Geometry

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: 10

Recommended semester: 4.

Educational level: III.

Prerequisites:

Course requirements:
Examination (A: 90%, B: 80%, C: 70%, D: 60% , E:50%)

Learning outcomes:
The student should master basic qualitative results and computational methods of work with real (semi)algebraic varieties. The student learns typical examples in spaces of dimensions 1, 2, 3, 4 and becomes able to use them in applications based on real semialgebraic objects, e.g. in geometric modeling, visualization etc.

Class syllabus:
Real closed fields. Semialgebraic sets, their properties and decomposition. Real and complex algebraic sets. Properties, examples, constructions. Real roots of polynomial systems and their localization – methods and algorithms.

Recommended literature:
Bochnak, J.; Coste, M.; Roy, M.-F., Real algebraic geometry. Berlin: Springer. ix, 430 p., (1998)
Basu, S.; Pollack, R.; Roy, M.-F., Algorithms in real algebraic geometry. 2nd ed. Berlin: Springer, 662 p., 2006

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. Pavel Chalmovianský, PhD.

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-017/10	Selected Topics in Low-Dimensional Topology

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: 7

Recommended semester: 3.

Educational level: III.

Prerequisites:

Course requirements:
Exam: written and oral exam
Indicative grading scheme: A: 90%, B: 80%, C: 70%, D: 60% , E:50%
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
The students will master classical results, as well as selected outcomes of the modern low-dimensional topological research.

Class syllabus:
The contents of the course will be adjusted, to some extent, to the interests of the students. The topics covered in the course will include mainly the following:
Basic notions, methods and results of knot and link theory; results from the topology of 3-dimensional manifolds: examples of manifolds, lens spaces, surgery, torus decompositions;
results on 4-dimensional manifolds: examples of manifolds, algebro-topological invariants, complex surfaces, the Kirby calculus.

Recommended literature:
Knots / Gerhard Burde, Heiner Zieschang, Michael Heusener. New York : Walter de Gruyter, 2013
Algebraic topology / Allen Hatcher. New York : Cambridge University Press, 2001
Algebraic topology / Edwin H. Spanier. New York : Springer, 1966
Knots, Links, Braids and 3-manifolds: An Introduction to the New Invariants in Low-Dimensional Topology / V. V. Prasolov, A. B. Sossinsky: AMS, Providence, 1996

Languages necessary to complete the course:
English, Slovak

Notes:

Past grade distribution Total number of evaluated students: 0	
ABS	NEABS
0,0	0,0
Lecturers: Mgr. Martin Niepel, PhD., doc. Mgr. Tibor Macko, PhD.	
Last change: 15.03.2022	
Approved by:	

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-807/10	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:
The student completes a scientific study stay in the corresponding area of study at an accredited foreign university or other scientific institution.

Class syllabus:
Preparations; choosing a suitable foreign scientific institution; completing the study stay.

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: doc. RNDr. Pavel Chalmovianský, PhD.

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-802/15	Teaching Practice in the Summer Semester

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: 2.

Educational level: III.

Prerequisites:

Course requirements:

Learning outcomes:
The student gains a personal experience as part of the training for teaching at a university.

Class syllabus:
Preparations for teaching. Teaching.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 15

ABS	NEABS
100,0	0,0

Lecturers: doc. RNDr. Pavel Chalmovianský, PhD.

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-801/15	Teaching Practice in the Winter Semester

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: 1.

Educational level: III.

Prerequisites:

Course requirements:

Learning outcomes:
The student gains a personal experience as part of the training for teaching at a university.

Class syllabus:
Preparations for teaching. Teaching.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 19

ABS	NEABS
100,0	0,0

Lecturers: doc. RNDr. Pavel Chalmovianský, PhD.

Last change: 03.09.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-025/10	Trends and Applications of Computer Graphics

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: 10

Recommended semester: 4.

Educational level: III.

Prerequisites:

Course requirements:
individual work 100%, examination 0%

Learning outcomes:
The PhD students will acquire the necessary general and specific methodological theoretical knowledge on trends and applications of computer graphics and they will be able to apply them to solve relevant theoretical and practical problems.

Class syllabus:
The course content can be (partially) individualized with regard to the dissertation topic.
Methodology of science, methodology of mathematical modeling and structured engineering design in computer graphics and image processing. Mathematical models relevant to the field of Visual Computing. Digital Processing of Visual Information with regard to the application of projective and affine geometry. Theory of HCI (Human Computer Interface).
(Applications.) CAD / CAM. Real-time rendering, visual effects and computer games. Advanced techniques of special modeling and 3D computer animation. International standardization (philosophy of the MPEG and SEDRIS standards, standardization for geodata and biodata). Medical informatics.

Recommended literature:
Real-time rendering / Tomas Akenine-Möller, Eric Haines, Naty Hoffman. Wellesley : A. K. Peters, 2008
Study materials in Slovak and selected recent papers and monographs in Visual Computing research.

Languages necessary to complete the course:
Slovak and English

Notes:

Past grade distribution Total number of evaluated students: 3	
ABS	NEABS
66,67	33,33
Lecturers: doc. RNDr. Andrej Ferko, PhD.	
Last change: 30.11.2021	
Approved by:	

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-027/10	Visualisation and Virtual Environments

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: 10

Recommended semester: 2.

Educational level: III.

Prerequisites:

Course requirements:
individual work 100%, examination 0%

Learning outcomes:
The PhD student receives theoretical and practical knowledge of visualization and virtual environments. If it is appropriate and possible, the students will participate in solving problems in a cooperating company, thus achieving practical applications of their theoretical knowledge.

Class syllabus:
The course content can be (partially) individualized with regard to the dissertation topic.
Methodology of scientific and technical visualization. Information visualisation. Visualization techniques and scenarios for geodata and medical data. Special representation (point-based graphics, implicit surfaces, volume graphics). Selected applications.
Virtual environments by Qvortrup. Cyberspace and virtual navigation, interaction and cooperation.
Computer games, visual effects and their programming in real time.
Digital storytelling.

Recommended literature:
The Visual Display of Quantitative Information / Edward R.Tufte. Graphics Press 2001.
Virtual Space / Lars Qvortrup et al. Springer-Verlag London 2002 2002.
The Data Science Design Manual / Steven S. Skiena. Cham: Springer Nature 2017.

Languages necessary to complete the course:
Slovak and English

Notes:

Past grade distribution
Total number of evaluated students: 1

ABS	NEABS
0,0	100,0

Lecturers: doc. RNDr. Andrej Ferko, PhD.

Last change: 30.11.2021
Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAG/3-MGT-808/10	Writing BSc 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:
The student writes a referee report on a Bc-degree thesis.

Class syllabus:
Reading of the Bc-degree thesis in question. Writing a referee report on it.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 2

ABS	NEABS
100,0	0,0

Lecturers: doc. RNDr. Pavel Chalmovianský, PhD.

Last change: 03.09.2015

Approved by: