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Academic year: 2025/2026 University: Comenius University Bratislava Faculty: Faculty of Mathematics, Physics and Informatics **Course ID: Course title:** FMFI.KAMŠ/3-MAM-002/15 Analysis of Models in Financial Mathematics **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: 10 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: prof. RNDr. Daniel Ševčovič, DrSc. Last change: 02.06.2015 Approved by: prof. RNDr. Daniel Ševčovič, DrSc.

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:

Course title:

FMFI.KAMŠ/3-MAM-036/25

Applied Graph Theory

Educational activities:

Type of activities: course

Number of hours:

per week: 2 per level/semester: 26 Form of the course: on-site learning

Type, volume, methods and workload of the student - additional information

2 (seminar)

Number of credits: 10

Recommended semester: 3.

Educational level: III.

Prerequisites:

Course requirements:

Final exam will be oral.

The questions on the final exam will be from the topics presented during the course.

Grade scale: A 90%, B 80%, C 70%, D 60%, E 50%

Scale of assessment (preliminary/final): Weight of work during semester / final exam: Practical work during semester 80% / final exam 20%.Continual evaluation is based on quality of presentations and participation in discussions.

Learning outcomes:

After completion of this course the students will be acquainted with advanced topics from graph theory with interdisciplinary emphasis.

Class syllabus:

Students will present shorter parts of a monograph, and thus for continuity they will need to understand the preceding parts as well. Individual parts will have scope of not exceeding one meeting. In case of smaller number of enrolled students, the teacher will present material from the monograph as well.

Recommended literature:

Recommended literature will change on yearly basis.

For year 2025/2026 the following monograph will be used:

Krebs M., Shaheen A., Expander families and Cayley Graphs: A beginner's guide, Oxford University Press, 288 pages, ISBN 978-0199767113

Languages necessary to complete the course:

English

Notes:

This course is possible to complete remotely.

Past grade distribution			
Total number of evaluated students: 0			
ABS	NEABS		
0,0			
Lecturers: doc. Mgr. Ondrej Šuch, PhD.			
Last change: 10.01.2025			
Approved by: prof. RNDr. Daniel Ševčovič, DrSc.			

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:

Course title:

FMFI.KAMŠ/3-MAM-014/00

Asymptotic Methods

Educational activities:

Type of activities: lecture

Number of hours:

per week: 2 per level/semester: 26 Form of the course: on-site learning

Number of credits: 10

Recommended semester: 2.

Educational level: III.

Prerequisites:

Course requirements:

Interim assessment during the semester has a weight of 30% (homeworks 20%, bonus exercises 10%). The two semester exam papers have a total weight of 70% (the first paper taken in the middle of the semester, the second paper taken at the end of the semester). The student must obtain at least half of the points from each semester exam paper. The final evaluation can be adjusted by an oral exam (theoretical questions, written preparation).

Grading: A (100-91), B (90-81), C (80-71), D (70-61), E (60-51), FX (50-0)

Scale of assessment (preliminary/final): 30/70

Learning outcomes:

To give an overview of basic asymptotic methods for solving algebraic and differential problems in applied mathematics.

Class syllabus:

Algebraic equations: Iterative method. Algebraic equations: Expansion method. Singular perturbations and rescaling. Logarithmic Poincare's expansions. Convergence and asymptoticity. Asymptotic approximation of integrals. Watson's lemma. The steepest descent method. Regular perturbation problems in differential equations. Singular perturbation problems in differential equations. Method of matched asymptotic expansions. Multiple scale method. WKBJ method. Poincare-Lindstedt method. Radius of convergence and Domb-Sykes plots.

Recommended literature:

- E. J. Hinch: Perturbation Methods, Cambridge University Press, 1991
- J. Kevorkian, J. D. Cole: Multiple Scale and Singular Perturbation Methods, Springer, 1996

Languages necessary to complete the course:

English

Notes:

Past grade distribution Total number of evaluated students: 9		
ABS	NEABS	
100,0	0,0	
Lecturers: doc. RNDr. Peter Guba, PhD.		
Last change: 22.06.2022		
Approved by: prof. RNDr. Daniel Ševčovič, DrSc.		

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:

Course title:

FMFI.KAMŠ/3-MAM-005/00

Biomathematics

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: 10

Recommended semester: 3.

Educational level: III.

Prerequisites:

Recommended prerequisites:

2-MAT-111 Dynamical Systems OR 2-MAT-112 Partial Differential Equations (1) OR 2-

MAT-121 Partial Differential Equations (2)

Course requirements:

Continuous assessment: individual work

Exam: final exam and project

Assessment grade scale: A 90%, B 80%, C 70%, D 60%, E 50%

Scale of assessment (preliminary/final): 50/50

Learning outcomes:

Students will become familiar with the theory and techniques used in current research in mathematical biology and in mathematical models in the natural and social sciences in general. At the same time, students try to work on a separate project in this area. They will also gain new knowledge from population models, chemical kinetics and cell biology.

Class syllabus:

Principles of mathematical modeling, modeling goals, model building, model simulations, parameter selection, non-dimensionalization, model robustness, results analysis. Biochemical kinetics, enzymatic reactions, cooperativity, quasi-stationary approximation. Epidemiological models. Dynamics on neural and other cell membranes, Hodgkin-Huxley model, Fitzhugh-Nagumo model.

Recommended literature:

A primer on mathematical models in biology / Lee A. Segel, Leah Edelstein-Keshet.

Philadelphia, Pa.: Society for Industrial and Applied Mathematics, 2013

Mathematical biology: 1.: An introduction / J. D. Murray. New York: Springer, 2002

Mathematical biology: 2.: Spatial models and biomedical applications / J. D. Murray. New

York: Springer, 2003

Nonlinear dynamics and chaos: with applications to physics, biology, chemistry, and

engineering / Steven H. Strogatz. Cambridge: Perseus Books, 1994

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. Richard Kollár, PhD.		
Last change: 13.03.2022		
Approved by: prof. RNDr. Daniel Ševčovič, DrS	c.	

Academic year: 2025/2026

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: 218

A	ABS	В	С	D	Е	FX	NEABS
38,53	57,34	0,46	0,0	0,0	1,83	0,0	1,83

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

Last change: 13.01.2025

Approved by: prof. RNDr. Daniel Ševčovič, DrSc.

Academic year: 2025/2026

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: 210

A	ABS	В	С	D	Е	FX	NEABS
41,9	52,38	0,0	0,0	0,0	0,0	0,0	5,71

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

Last change: 13.01.2025

Approved by: prof. RNDr. Daniel Ševčovič, DrSc.

Academic year: 2025/2026				
University: Comenius University Bratislava				
Faculty: Faculty of Mathematics, Physics and Informatics				
Course ID: FMFI.KAMŠ/3-MAM-806/15				
Educational activities: Type of activities: independent Number of hours: per week: 5 per level/semes Form of the course: on-site le	ster: 65			
Number of credits: 5				
Recommended semester:				
Educational level: III.				
Prerequisites:				
Course requirements:				
Learning outcomes:	Learning outcomes:			
Class syllabus:				
Recommended literature:				
Languages necessary to comp	lete the course:			
Notes:				
Past grade distribution Total number of evaluated stud	ents: 21			
ABS	ABS NEABS			
100,0 0,0				
Lecturers:				
Last change: 02.06.2015				
Approved by: prof. RNDr. Dar	niel Ševčovič, DrSc.			

Academic year: 2025/2026				
University: Comenius University Bratislava				
Faculty: Faculty of Mathematics, Physics and Informatics				
Course ID: FMFI.KAMŠ/3-MAM-203/10	Course title: Department Seminar (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: 2.				
Educational level: III.				
Prerequisites:				
Course requirements:	Course requirements:			
Learning outcomes:				
Class syllabus:	Class syllabus:			
Recommended literature:				
Languages necessary to comp	Languages necessary to complete the course:			
Notes:	Notes:			
Past grade distribution Total number of evaluated students: 14				
ABS NEABS				
100,0 0,0				
Lecturers: prof. RNDr. Daniel Margaréta Halická, CSc., doc. M		orof. RNDr. Pavol Quittner, DrSc., doc. RNDr. man, PhD.		
Last change: 02.06.2015				
Approved by: prof RNDr Dan	iel Ševčovič DrS	c		

Academic year: 2025/2026			
University: Comenius University Bratislava			
Faculty: Faculty of Mathematic	es, Physics and Informatics		
Course ID: FMFI.KAMŠ/3-MAM-204/10	Course title: Department Seminar (2)		
Educational activities: Type of activities: Number of hours: per week: per level/semest Form of the course: on-site le			
Number of credits: 5			
Recommended semester: 4.			
Educational level: III.			
Prerequisites:			
Course requirements:			
Learning outcomes:			
Class syllabus:			
Recommended literature:			
Languages necessary to comp	lete the course:		
Notes:			
Past grade distribution Total number of evaluated stud	ents: 12		
ABS	ABS NEABS		
100,0 0,0			
Lecturers: prof. RNDr. Daniel Pavol Quittner, DrSc., doc. Mgr	Ševčovič, DrSc., doc. RNDr. Margaréta Halická, CSc., prof. RNDr. Radoslav Harman, PhD.		
Last change: 02.06.2015			
Approved by: prof. RNDr. Dar	niel Ševčovič, DrSc.		

Academic year: 2025/2026				
University: Comenius University Bratislava				
Faculty: Faculty of Mathematic	Faculty: Faculty of Mathematics, Physics and Informatics			
Course ID: FMFI.KAMŠ/3-MAM-205/10	Course title: Department Seminar (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: 6.				
Educational level: III.				
Prerequisites:	Prerequisites:			
Course requirements:				
Learning outcomes:				
Class syllabus:				
Recommended literature:				
Languages necessary to comp	lete the course:			
Notes:				
Past grade distribution Total number of evaluated students: 11				
ABS NEABS				
100,0 0,0				
Lecturers: prof. RNDr. Daniel Ševčovič, DrSc., prof. RNDr. Pavol Quittner, DrSc., doc. RNDr. Margaréta Halická, CSc., doc. Mgr. Radoslav Harman, PhD.				
Last change: 02.06.2015				
Approved by: prof. RNDr. Daniel Ševčovič, DrSc.				

Academic year: 2025/2026	Academic year: 2025/2026			
University: Comenius University Bratislava				
Faculty: Faculty of Mathematic	es, Physics and Int	Formatics		
Course ID: FMFI.KAMŠ/3-MAM-206/10	Course title: Department Seminar (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: 8.				
Educational level: III.				
Prerequisites:				
Course requirements:	Course requirements:			
Learning outcomes:				
Class syllabus:				
Recommended literature:				
Languages necessary to comp	lete the course:			
Notes:				
Past grade distribution Total number of evaluated students: 6				
ABS NEABS				
100,0 0,0				
Lecturers: prof. RNDr. Daniel Ševčovič, DrSc., doc. RNDr. Margaréta Halická, CSc., prof. RNDr. Pavol Quittner, DrSc., doc. Mgr. Radoslav Harman, PhD.				
Last change: 02.06.2015	Last change: 02.06.2015			
Approved by: prof. RNDr. Daniel Ševčovič, DrSc.				

STATE EXAM DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:
FMFI.KAMŠ/3-MAM-990/15

Course title:
Dissertation Thesis Defense

Number of credits: 30

Educational level: III.

State exam syllabus:

Last change: 02.06.2015

Approved by: prof. RNDr. Daniel Ševčovič, DrSc.

Academic year: 2025/2026 University: Comenius University Bratislava Faculty: Faculty of Mathematics, Physics and Informatics **Course ID: Course title:** FMFI.KAMŠ/3-MAM-031/15 Fundamentals of Mathematical Modelling in Empirical Sciences **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: 10 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: 1 ABS **NEABS** 100,0 0,0 Lecturers: doc. Mgr. Ján Mačutek, PhD. Last change: 02.06.2015 Approved by: prof. RNDr. Daniel Ševčovič, DrSc.

Academic year: 2025/2026			
University: Comenius University	ty Bratislava		
Faculty: Faculty of Mathematic	es, Physics and Informatics		
Course ID: FMFI.KAMŠ/3-MAM-803/15	Course title: Guidance of a Final Thesis or of a Project for the Students' Conference		
Educational activities: Type of activities: other Number of hours: per week: 5 per level/semes Form of the course: on-site le			
Number of credits: 5			
Recommended semester:			
Educational level: III.			
Prerequisites:			
Course requirements:			
Learning outcomes:			
Class syllabus:			
Recommended literature:			
Languages necessary to comp	lete the course:		
Notes:			
Past grade distribution Total number of evaluated stud	ents: 26		
ABS NEABS			
100,0	0,0		
Lecturers:	•		
Last change: 02.06.2015			
Approved by: prof. RNDr. Dar	niel Ševčovič. DrSc.		

Academic year: 2025/2026		
University: Comenius University Bratislava		
Faculty: Faculty of Mathematic	es, Physics and Informatics	
Course ID: FMFI.KAMŠ/3-MAM-804/10	Course title: Guidance of the Students' Research 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:		
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: prof. RNDr. Dan	niel Ševčovič, DrSc.	

Academic year: 2025/2026 University: Comenius University Bratislava Faculty: Faculty of Mathematics, Physics and Informatics **Course ID: Course title:** FMFI.KAMŠ/3-MAM-101/15 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: 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: 21 ABS **NEABS** 95,24 4,76 **Lecturers:** Last change: 02.06.2015 Approved by: prof. RNDr. Daniel Ševčovič, DrSc.

Academic year: 2025/2026 University: Comenius University Bratislava Faculty: Faculty of Mathematics, Physics and Informatics **Course ID: Course title:** FMFI.KAMŠ/3-MAM-104/15 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: 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: 21 ABS **NEABS** 100,0 0,0 **Lecturers:** Last change: 02.06.2015 Approved by: prof. RNDr. Daniel Ševčovič, DrSc.

Academic year: 2025/2026 University: Comenius University Bratislava Faculty: Faculty of Mathematics, Physics and Informatics **Course ID: Course title:** FMFI.KAMŠ/3-MAM-001/15 Interior-point methods in linear programming **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: 10 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: 3 ABS **NEABS** 100,0 0,0 Lecturers: doc. RNDr. Margaréta Halická, CSc. Last change: 02.06.2015 Approved by: prof. RNDr. Daniel Ševčovič, DrSc.

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:

Course title:

FMFI.KAMŠ/3-MAM-035/24

Introduction to Classification Methods

Educational activities:

Type of activities: course

Number of hours:

per week: 2 per level/semester: 26 Form of the course: on-site learning

Type, volume, methods and workload of the student - additional information

2 (seminar)

Number of credits: 10

Recommended semester: 1.

Educational level: III.

Prerequisites:

Course requirements:

Final exam will be oral.

The questions on the final exam will be from the topics presented during the course.

Grade scale: A 90%, B 80%, C 70%, D 60%, E 50%

Scale of assessment (preliminary/final): Weight of work during semester / final exam: Practical work during semester 80% / final exam 20%.

Learning outcomes:

After completion of this class the students will be acquainted with classification methods from statistics and machine learning, as well as with mathematical principles on which they are based.

Class syllabus:

Students will present shorter parts of a monograph, and thus for continuity they will need to understand the preceding parts as well. Individual parts will have scope of not exceeding one meeting. In case of smaller number of enrolled students, the teacher will present material from the monograph as well.

Covered topics include: concept of a classification model, evaluation of models, linear and tree models, linear discriminant analysis (LDA), logistic regression, inference about statistical models, crossentropy, support vector machines.

Recommended literature:

James G., Witten D., Hastie T., Tibshirani R. An introduction to statistical learning: with applications in R, Springer Nature, 2021, 622 strán, ISBN 978-10716114181

Languages necessary to complete the course:

English

Notes:

This course is possible to complete remotely.

Past grade distribution		
Total number of evaluated students: 0		
ABS	NEABS	
0,0	0,0	
Lecturers: doc. Mgr. Ondrej Šuch, PhD.		
Last change: 10.01.2025		
Approved by: prof. RNDr. Daniel Ševčovič, DrSc.		

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:

Course title:

FMFI.KAMŠ/3-MAM-009/15

Models of Fluids Dynamics

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: 10

Recommended semester: 3.

Educational level: III.

Prerequisites:

Course requirements:

Interim assessment during the semester has a weight of 30% (homeworks 20%, bonus exercises 10%). The two semester exam papers have a total weight of 70% (the first paper taken in the middle of the semester, the second paper taken at the end of the semester). The student must obtain at least half of the points from each semester exam paper. The final evaluation can be adjusted by an oral exam (theoretical questions, written preparation).

Grading: A (100-91), B (90-81), C (80-71), D (70-61), E (60-51), FX (50-0)

Scale of assessment (preliminary/final): 30/70

Learning outcomes:

Teach the students to derive and analyse basic equations describing fluid flow.

Class syllabus:

Equations of motion for ideal fluids. Vorticity. Irrotational flow. Vorticity equation.

Equations of motion for viscous fluids. Examples of simple viscous flows. Flows with circular streamlines.

Convection and diffusion of vorticity. Gravity waves. Dispersion and group velocity. Surface tension effects and capillary waves.

Internal gravity waves. Waves with finite amplitude. Hydraulic shocks and solitary waves. Kelvin-Helmholtz instability. Thermal convection. Centrifugal instability. Theorem on the stability of shear flow. General theorem on the stability of viscous flow. Uniqueness of steady viscous flow. Transition to turbulence.

Recommended literature:

- D. J. Acheson: Elementary Fluid Dynamics, Oxford, Clarendon Press, 1990
- G. K. Batchelor: An Introduction to Fluid Dynamics, Cambridge University Press, 2000
- P. Guba: Dynamika tekutín, skriptá, FMFI UK, 2021

Languages necessary to complete the course:

English

Notes:

Past grade distribution		
Total number of evaluated students: 2		
ABS	NEABS	
100,0	0,0	
Lecturers: doc. RNDr. Peter Guba, PhD.		
Last change: 22.06.2022		
Approved by: prof. RNDr. Daniel Ševčovič, DrSc.		

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:

Course title:

FMFI.KAMŠ/3-MAM-007/15

Modern Methods of Convex Optimisation

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: 10

Recommended semester: 2.

Educational level: III.

Prerequisites:

Course requirements:

The student actively participates in the course and gives a talk on an agreed topic.

Scale of assessment (preliminary/final): 100% /0

Learning outcomes:

Students become familiar with new fields of convex optimization and with modern algorithmic approaches for solving these problems. They will become familiar with the newest results, trends and open problems in convex optimization.

Class syllabus:

Conic convex programming, duality theory on conic convex programming, applications of conic programming in various areas, Theory of interior point methods, interior-point algorithms vor large scale conic problems, conic relaxations.

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: doc. RNDr. Mária Trnovská, PhD.

Last change: 16.06.2022

Approved by: prof. RNDr. Daniel Ševčovič, DrSc.

Academic year: 2025/2026			
University: Comenius University Bratislava			
Faculty: Faculty of Mathematic	Faculty: Faculty of Mathematics, Physics and Informatics		
Course ID: FMFI.KAMŠ/3-MAM-024/10	Course title: Nonlinear Statistical Models		
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: 10			
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: 10			
ABS	NEABS		
100,0	0,0		
Lecturers: doc. Mgr. Lenka Filová, PhD.			
Last change: 02.06.2015			
Approved by: prof. RNDr. Daniel Ševčovič, DrSc.			

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:

Course title:

FMFI.KAMŠ/3-MAM-037/25

Numerical modelling transport processes

Educational activities:

Type of activities: course

Number of hours:

per week: 2 per level/semester: 26 Form of the course: on-site learning

Type, volume, methods and workload of the student - additional information

Type of activities: course

Number of hours:

per week: 2 per level/semester: 26

Number of credits: 10

Recommended semester: 3.

Educational level: III.

Prerequisites:

Recommended prerequisites:

2-EFM-107/15 Partial differential equations

2-EFM-101/15 Numerical modelling

3-MAM-009/15 Fluid flow models

Course requirements:

Exam: oral

Grading: A (100-91), B (90-81), C (80-71), D (70-61), E (60-51), FX (50-0)

Scale of assessment (preliminary/final): 30/70

Learning outcomes:

Students are introduced to the finite volume method for the numerical solution of partial differential equations describing diffusion and advection problems in applied mathematics.

Class syllabus:

Introduction to the finite volume method

- 1. Discretization schemes for advection-diffusion equations (central, upwind and hybrid differencing schemes) 2. Properties of the discretization schemes (conservativeness, boundedness and transportiveness) 3. Solution algorithms for pressure-velocity coupling (SIMPLE and PISO algorithms) 4. Direct and iterative methods for solving discretised equations (TDMA, Jacobi and Gauss-Seidel methods) Application of OpenFOAM® software in solving fluid dynamics problems
- 5. The heat transfer equation 6. The Navier–Stokes equations for single-phase incompressible flows
- 7. Lid-driven cavity flow 8. Poiseuille flow Meshing for complex geometries with OpenFOAM®
- 9. Flow around a cylinder. Von Kármán vortex street 10. Single-phase flow in the pore space. Scalar and particulate transport in the pore space Application of OpenFOAM® software in solving problems in financial mathematics and biomathematics 11. The Black–Scholes equation for option pricing 12. The Fisher–KPP equation for population dynamics

Recommended literature:

S. V. Patankar: Numerical Heat Transfer and Fluid Flow, CRC Press, 2018

F. Moukalled, L. Mangani and M. Darwish: The Finite Volume Method in Computational Fluid Dynamics: An Advanced Introduction with OpenFOAM® and Matlab®, Springer,2016

H. K. Versteeg and W. Malalasekera: An Introduction to Computational Fluid Dynamics: The Finite Volume Method, Pearson, 2007

Languages necessary to complete the course:

Slovak, English

Notes:

Past grade distribution

Total number of evaluated students: 0

ABS	NEABS
0,0	0,0

Lecturers: Mgr. Radoslav Hurtiš, PhD., doc. RNDr. Peter Guba, PhD.

Last change: 01.05.2025

Approved by: prof. RNDr. Daniel Ševčovič, DrSc.

Academic year: 2025/2026 University: Comenius University Bratislava Faculty: Faculty of Mathematics, Physics and Informatics **Course ID: Course title:** FMFI.KAMŠ/3-MAM-701/15 Obtaing the Comenius University Grant for the Young **Educational activities:** Type of activities: independent work **Number of hours:** per week: 20 per level/semester: 260 Form of the course: on-site learning Number of credits: 20 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: 15 ABS **NEABS** 100,0 0,0 **Lecturers:** Last change: 02.06.2015 Approved by: prof. RNDr. Daniel Ševčovič, DrSc.

Academic year: 2025/2026	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/3-MAM-805/10	Course title: Participation in a Conference Organising Committee
Educational activities: Type of activities: Number of hours: per week: per level/semest Form of the course: on-site le	
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: 3	
ABS	NEABS
100,0	0,0
Lecturers:	
Last change:	
Approved by: prof. RNDr. Dar	niel Ševčovič, DrSc.

STATE EXAM DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:
FMFI.KAMŠ/3-MAM-950/15

Course title:
Passing Dissertation Examination

Number of credits: 20

Educational level: III.

State exam syllabus:

Last change: 02.06.2015

Approved by: prof. RNDr. Daniel Ševčovič, DrSc.

Academic year: 2025/2026 University: Comenius University Bratislava Faculty: Faculty of Mathematics, Physics and Informatics **Course ID: Course title:** FMFI.KAMŠ/3-MAM-403/15 Presentation at a Homeland Conference or Department Seminar **Educational activities:** Type of activities: independent work **Number of hours:** per week: 5 per level/semester: 65 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: 26 ABS **NEABS** 92,31 7,69 **Lecturers:** Last change: 02.06.2015 Approved by: prof. RNDr. Daniel Ševčovič, DrSc.

Academic year: 2025/2026 University: Comenius University Bratislava Faculty: Faculty of Mathematics, Physics and Informatics **Course ID: Course title:** FMFI.KAMŠ/3-MAM-401/15 Presentation at an International Conference **Educational activities:** Type of activities: independent work **Number of hours:** per week: 20 per level/semester: 260 Form of the course: on-site learning Number of credits: 20 **Recommended semester: 8. 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: 28 ABS **NEABS** 100,0 0,0 **Lecturers:** Last change: 02.06.2015 Approved by: prof. RNDr. Daniel Ševčovič, DrSc.

Academic year: 2025/2026		
University: Comenius University Bratislava		
Faculty: Faculty of Mathematics, Physics and Informatics		
Course ID: FMFI.KAMŠ/3-MAM-018/10	Course title: Probability 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: 10		
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: 8		
ABS	NEABS	
87,5	12,5	
Lecturers: prof. RNDr. Anatolij Dvurečenskij, DrSc.		
Last change: 02.06.2015		
Approved by: prof. RNDr. Daniel Ševčovič, DrSc.		

Academic year: 2025/2026 University: Comenius University Bratislava Faculty: Faculty of Mathematics, Physics and Informatics **Course ID: Course title:** FMFI.KAMŠ/3-MAM-302/15 Publication in a Reviewed Periodical or Reviewed Almanac **Educational activities:** Type of activities: independent work **Number of hours:** per week: 15 per level/semester: 195 Form of the course: on-site learning Number of credits: 15 **Recommended semester:** 6. **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: 15 ABS **NEABS** 100,0 0,0 **Lecturers:** Last change: 02.06.2015 Approved by: prof. RNDr. Daniel Ševčovič, DrSc.

Academic year: 2025/2026 University: Comenius University Bratislava Faculty: Faculty of Mathematics, Physics and Informatics **Course ID: Course title:** FMFI.KAMŠ/3-MAM-301/15 Publication in an A-category Periodical **Educational activities:** Type of activities: independent work **Number of hours:** per week: 30 per level/semester: 390 Form of the course: on-site learning Number of credits: 30 **Recommended semester:** 6. **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: 11 ABS **NEABS** 100,0 0,0 **Lecturers:** Last change: 02.06.2015 Approved by: prof. RNDr. Daniel Ševčovič, DrSc.

Academic year: 2025/2026		
University: Comenius University Bratislava		
Faculty: Faculty of Mathematics, Physics and Informatics		
Course ID: FMFI.KAMŠ/3-MAM-030/15		
Educational activities: Type of activities: lecture Number of hours: per week: 2 per level/semes Form of the course: on-site le		
Number of credits: 10		
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: 1		
ABS NEABS		
100,0 0,0		
Lecturers: doc. RNDr. Katarína Janková, CSc.		
Last change: 02.06.2015		
Approved by: prof. RNDr. Daniel Ševčovič, DrSc.		

Academic year: 2025/2026		
University: Comenius University Bratislava		
Faculty: Faculty of Mathematics, Physics and Informatics		
Course ID: FMFI.KAMŠ/3-MAM-706/15	Course title: Response to a Publication	
Educational activities: Type of activities: other Number of hours: per week: 3 per level/semes Form of the course: on-site le		
Number of credits: 3		
Recommended semester: 8.		
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: 2		
ABS NEABS		
100,0 0,0		
Lecturers:		
Last change: 02.06.2015		
Approved by: prof. RNDr. Daniel Ševčovič, DrSc.		

Academic year: 2025/2026 University: Comenius University Bratislava Faculty: Faculty of Mathematics, Physics and Informatics **Course ID: Course title:** FMFI.KAMŠ/3-MAM-704/15 Response to a WoK- or SCOPUS-registered Publication **Educational activities:** Type of activities: other **Number of hours:** per week: 6 per level/semester: 78 Form of the course: on-site learning **Number of credits:** 6 **Recommended semester:** 8. **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: prof. RNDr. Daniel Ševčovič, DrSc.

Academic year: 2025/2026		
University: Comenius University Bratislava		
Faculty: Faculty of Mathematics, Physics and Informatics		
ourse ID: MFI.KAMŠ/3-MAM-702/15 Course title: Scientific Project Co-researcher		
Educational activities: Type of activities: independent Number of hours: per week: 10 per level/semo Form of the course: on-site le	ester: 130	
Number of credits: 10		
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 stud	ents: 28	
ABS	NEABS	
100,0 0,0		
Lecturers:		
Last change: 02.06.2015		
Approved by: prof. RNDr. Daniel Ševčovič, DrSc.		

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: Course title:

FMFI.KAMŠ/3-MAM-003/00 | Selected Topics from Financial Mathematics

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: 10

Recommended semester: 4.

Educational level: III.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

- Selected interest rate models
- Multi-period models of portfolio theory
- Derivative pricing with transaction costs
- Portfolio risk management

Recommended literature:

Wilmott, P., Dewynne, J, Howison, S.: Option Pricing, Mathematical Models and Computations, UK: Oxford Financial Press, 1995

Kwok, Y.K.: Mathematical models of financial derivatives, Berlin, Springer Verlag, 1998. Hull, J.: Options, futures and other derivative securities, New York, Prentice Hall, 1989.

Languages necessary to complete the course:

Notes:

Past grade distribution

Total number of evaluated students: 8

ABS	NEABS
100,0	0,0

Lecturers: doc. Mgr. Igor Melicherčík, PhD.

Last change: 02.06.2015

Approved by: prof. RNDr. Daniel Ševčovič, DrSc.

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:

Course title:

FMFI.KAMŠ/3-MAM-033/23

Selected Topics from Survival Analysis

Educational activities:

Type of activities: lecture

Number of hours:

per week: 2 per level/semester: 26 Form of the course: on-site learning

Type, volume, methods and workload of the student - additional information

lectures

Number of credits: 10

Recommended semester: 1., 3.

Educational level: III.

Prerequisites:

Course requirements:

project

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

Learning outcomes:

Students will gain knowledge on selected statistical methods in survival analysis and how to use them when analyzing censored data

Class syllabus:

Censoring, survival function and hazard function. Discrete time models. Nonparametric estimates. Kaplan-Meier estimate. Comparing two survival datasets. Log-rank test. Wilcoxon test. Proportional hazards model. Likelihood function for proportional hazards model parameters. Weibull model as a proportional hazards model. Log-linear form of the Weibull distribution. More distributions used in survival analysis. Diagnostics in proportional hazards model. Cox-Snell residuals. Martingale residuals. Aft (accelerated failure time) models. Cox regression model. Models with time-dependent explanatory variables.

Recommended literature:

Collett, David. Modelling survival data in medical research. CRC press, 2015.

Klein, John P., et al., eds. Handbook of survival analysis. Boca Raton, FL:: CRC Press, 2014.

Broström, G. Event history analysis with R. Chapman and Hall/CRC, 2021

Languages necessary to complete the course:

Slovak, English

Notes:

Past grade distribution		
Total number of evaluated students: 2		
ABS	NEABS	
100,0	0,0	
Lecturers: doc. Mgr. Lenka Filová, PhD.		
Last change: 16.05.2023		
Approved by: prof. RNDr. Daniel Ševčovič, DrSc.		

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: Course title:

FMFI.KAMŠ/3-MAM-025/10 | Simulation Methods

Educational activities:

Type of activities: lecture

Number of hours:

per week: 2 per level/semester: 26 Form of the course: on-site learning

Number of credits: 10

Recommended semester: 2., 4.

Educational level: III.

Prerequisites:

Course requirements:

Preliminary semester evaluation: projects Final examination: oral examination

Approximate grade thresholds: A 90%, B 80%, C 70%, D 60%, E 50%

Scale of assessment (preliminary/final): 50/50

Learning outcomes:

After completing the course, students will be able to use advanced techniques of variance reduction and simulation generation of random vectors and processes.

Class syllabus:

Selected methods of simulation sampling of random vectors and random processes (uniform and non-uniform generation on the surface and in the interior of multi-dimensional spheres and polyhedrons, sampling of processes used in financial mathematics). Advanced variance reduction techniques and simulation of rare events.

Recommended literature:

Ross S: Simulation, Elsevier Academic Press 2006

Fishman GS: Monte Carlo: Concepts, Algorithms and Applications, Springer 1996

Selected scientific papers

Languages necessary to complete the course:

Slovak, English

Notes:

Past grade distribution

Total number of evaluated students: 16

ABS	NEABS
93,75	6,25

Lecturers: doc. Mgr. Radoslav Harman, PhD.

Last change: 08.05.2017

Approved by: prof. RNDr. Daniel Ševčovič, DrSc.

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:

Course title:

FMFI.KAMŠ/3-MAM-019/10

Stochastic Models in Insurance and Actuarial Science

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: 10

Recommended semester: 3.

Educational level: III.

Prerequisites:

Course requirements:

During the semester the student can get 100% points for one written exam, which is usually written at the end of the semester.

Grade thresholds: A: 100.00% – 90.00%; B: 89.99% – 80.00%; C: 79.99% – 70.00%; D: 69.99% – 60.00%; E: 59.99% – 50.00%; Fx: 49.99% – 0.00%.

Scale of assessment (preliminary/final): Practical work during semester 100% / final exam 0%.

Learning outcomes:

After completing the course, the student will gain a detailed overview of ruin theory and the Cramér-Lundberg model. He or she will be able to approximate the ruin probability of the insurance company even if the claim size distribution has a heavy right tail. In addition, the student will know the various generalizations of the strong law of large numbers that are used in the field of non-life insurance.

Class syllabus:

Probability distributions of small and large claims. Heavy tailed probability distributions: subexponential distributions, long tailed distributions, regularly varying distributions, distributions with fat tails. Risk process in non-life insurance. Cramér-Lundberg model, Cramér-Lundberg theorem. Probability of ruin of an insurance company in finite and infinite time. Generalized versions of the strong law of large numbers. Law of the iterated logarithm.

Recommended literature:

Mathematical Methods in Risk Theory / Hans Bühlmann. New York: Springer, 1996; Modern Actuarial Risk Theory Using R / Rob Kaas, Marc Goovaerts, Jan Dhaene, Michel Denuit. Second Edition, Heidelberg: Springer-Verlag, 2008;

Insurance Risk and Ruin / David C. M. Dickson. First Edition, New York: Cambridge University

Press, 2005;
Non-Life Insurance Mathematics / Thomas Mikosch. Second Edition, Heidelberg: Springer-

Non-Life Insurance Mathematics / Thomas Mikosch. Second Edition, Heidelberg: Springer-Verlag, 2009.

Languages necessary to complete the course:

Slovak, English

Notes:		
Past grade distribution Total number of evaluated students: 0		
ABS	NEABS	
0,0	0,0	
Lecturers: Mgr. Gábor Szűcs, PhD., doc. RNDr. Katarína Janková, CSc.		
Last change: 15.06.2022		
Approved by: prof. RNDr. Daniel Ševčovič, DrSc.		

Academic year: 2025/2026		
University: Comenius University Bratislava		
Faculty: Faculty of Mathematic	es, Physics and Informatics	
ourse ID: Course title: MFI.KAMŠ/3-MAM-807/10 Study Stay Abroad		
Educational activities: Type of activities: Number of hours: per week: per level/semester Form of the course: on-site le		
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	ents: 2	
ABS NEABS		
100,0 0,0		
Lecturers:		
Last change:		
Approved by: prof. RNDr. Daniel Ševčovič, DrSc.		

Academic year: 2025/2026		
University: Comenius University Bratislava		
Faculty: Faculty of Mathematics, Physics and Informatics		
Course ID: FMFI.KAMŠ/3-MAM-802/15		
Educational activities: Type of activities: other Number of hours: per week: 8 per level/semester: 104 Form of the course: on-site learning		
Number of credits: 8		
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: 55		
ABS NEABS		
100,0 0,0		
Lecturers:		
Last change: 02.06.2015		
Approved by: prof. RNDr. Daniel Ševčovič, DrSc.		

Academic year: 2025/2026		
University: Comenius University Bratislava		
Faculty: Faculty of Mathematics, Physics and Informatics		
MFI.KAMŠ/3-MAM-801/15 Course title: Teaching Practice in the Winter Semester		
Educational activities: Type of activities: other Number of hours: per week: 8 per level/semester: 104 Form of the course: on-site learning		
Number of credits: 8		
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: 63		
ABS NEABS		
100,0 0,0		
Lecturers:		
Last change: 02.06.2015		
Approved by: prof. RNDr. Daniel Ševčovič, DrSc.		

Academic year: 2025/2026
University: Comenius University Bratislava
Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: Course title:

FMFI.KAMŠ/3-MAM-034/24 | Theory of Dynamic Equations and Inequalities on Time scales

Educational activities:

Type of activities: course

Number of hours:

per week: 2 per level/semester: 26 Form of the course: on-site learning

Type, volume, methods and workload of the student - additional information

2 (lectures)

Number of credits: 10

Recommended semester: 4.

Educational level: III.

Prerequisites:

Course requirements:

Exam: oral

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

Learning outcomes:

Students will learn the basics of the dynamic calculus on time scales with a focus on the principles underlying dynamic equations and inequalities on time scales.

Class syllabus:

- 1. Fundamentals of time scale calculus.
- 2. Differential calculus for single-variable functions on time scales.
- 3. Integral calculus for single-variable functions on time scales.
- 4. Introduction to dynamic equations: basic concepts, existence and uniqueness theorems.
- 5. Introduction to dynamic inequalities: overview of fundamental inequalities on time scales and their significance.

Recommended literature:

- 1. Bohner, M. and Allan Peterson Dynamic Equations on Time Scales: An Introduction with Applications. Birkhauser, 2001.
- 2. Bohner, Martin, and Allan Peterson. "Advances in Dynamic Equations on Time Scales, Birkhauser, 2003
- 3. Agarwal, Ravi, Donal O'Regan, and Samir Saker. Dynamic inequalities on time scales. Vol. 2014. Cham: Springer, 2014.

Notes:

Past grade distribution		
Total number of evaluated students: 0		
ABS	NEABS	
0,0	0,0	
Lecturers: Ing. Irena Jadlovská, PhD.		
Last change: 10.01.2025		
Approved by: prof. RNDr. Daniel Ševčovič, DrSc.		

Academic year: 2025/2026	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/3-MAM-808/15	Course title: Writing Final Thesis Assessment Protocol
Educational activities: Type of activities: independent work Number of hours: per week: 2 per level/semester: 26 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: 33	
ABS	NEABS
100,0	0,0
Lecturers:	
Last change: 02.06.2015	
Approved by: prof. RNDr. Daniel Ševčovič, DrSc.	