

Course descriptions

TABLE OF CONTENTS

1. 1-UMA-116/22	Algebra and Theoretical Arithmetic (2).....	2
2. 1-UMA-124/22	Combinatorics.....	3
3. 2-pUMA-912/19	Didactics of Mathematics (state exam).....	5
4. 2-UMA-104/22	Didactics of Mathematics (1).....	6
5. 2-UMA-106/22	Didactics of Mathematics (3).....	8
6. 2-pUMA-901/19	Diploma Thesis Project.....	10
7. 1-UMA-107/15	Geometry (1).....	11
8. 1-UMA-220/15	Geometry (2).....	13
9. 1-UMA-301/22	Geometry (3).....	15
10. 2-UMA-114/22	Non-traditional Forms of Teaching.....	17
11. 2-UMA-211/22	Seminar in History of Mathematics (1).....	18
12. 2-UMA-212/15	Seminar in History of Mathematics (2).....	20
13. 2-pUMAx-211/19	Teaching Practice.....	22
14. 2-pUMA-911/19	Thesis Defence (state exam).....	23

COURSE DESCRIPTION

Academic year: 2023/2024					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFI.KAG/1-UMA-116/22		Course title: Algebra and Theoretical Arithmetic (2)			
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: I., N					
Prerequisites:					
Course requirements: Preliminary assessment: homework (20%), written tests (40%) Final assessment: oral exam (40%) Grading: A 90%, B 80%, C 70%, D 60%, E 50%					
Learning outcomes: Students master the basics of divisibility theory in the field of integers and its applications and will be able to actively use this knowledge to solve various problems. Furthermore, they will control the expression of real numbers using g-adic developments and selected criteria for the rationality (irrationality) of real numbers.					
Class syllabus: Divisibility of integers, greatest common divisor, Euclidean algorithm, least common multiple. Prime numbers, decomposition into the product of prime numbers. Congruences, Euler's theorem and its applications, Lagrange's theorem. Number systems and divisibility criteria. Selected arithmetic functions. Rational and irrational numbers. G-adic development of real numbers. Criteria of rationality of real numbers.					
Recommended literature:					
Languages necessary to complete the course:					
Notes:					
Past grade distribution Total number of evaluated students: 181					
A	B	C	D	E	FX
41,44	25,41	20,44	7,73	1,66	3,31
Lecturers: prof. RNDr. Pavol Zlatoš, PhD., RNDr. Jana Chalmovianská, PhD.					
Last change: 21.06.2022					
Approved by:					

COURSE DESCRIPTION

Academic year: 2023/2024					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFI.KAG/1-UMA-124/22		Course title: Combinatorics			
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: I., N					
Prerequisites:					
Course requirements: Continuous evaluation: homework Final examination: written exam Grades: A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 50/50					
Learning outcomes: Gaining comprehensive overview of basic combinatorial problems and skills to solve them.					
Class syllabus: Basic combinatorial tools, permutations, combinations, binomila coefficients and Pascal triangle, binomial an multinomial theorem, combinatorial identities, principle of inclusion and exlusion, Dirichlet principle.					
Recommended literature: Kapitoly z diskretní matematiky: Jiří Matoušek, Jaroslav Nešetřil. Praha: Karolinum, 2009 Kombinatorika a teória grafov: Martin Knor. Bratislava: Vydavateľstvo UK, 2000 Lecture notes.					
Languages necessary to complete the course: slovak, english					
Notes:					
Past grade distribution Total number of evaluated students: 277					
A	B	C	D	E	FX
35,74	15,88	13,0	13,72	17,69	3,97
Lecturers: doc. RNDr. Martin Mačaj, PhD., PaedDr. Peter Vankúš, PhD., Mgr. Martin Niepel, PhD., Mgr. Tomáš Rusin, PhD.					
Last change: 12.03.2022					

Approved by:

STATE EXAM DESCRIPTION

Academic year: 2023/2024	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KDMFI/2- pUMA-912/19	Course title: Didactics of Mathematics
Number of credits: 0	
Educational level: N	
State exam syllabus:	
Last change: 04.12.2019	
Approved by:	

COURSE DESCRIPTION

Academic year: 2023/2024	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KDMFI/2-UMA-104/22	Course title: Didactics of Mathematics (1)
Educational activities: Type of activities: seminar Number of hours: per week: 3 per level/semester: 39 Form of the course: on-site learning	
Number of credits: 4	
Recommended semester: 3.	
Educational level: II., N	
Prerequisites:	
Course requirements: Continuous assessment: group homework, reading of scientific articles, discussion of articles and the specified topic, group work on a lesson plan described for each group in the assignment. The student must obtain at least 50% of the continuous assessment and each assignment must be evaluated with a non-zero number of points. Final evaluation: oral exam, individual preparation of a lesson plan and its presentation Indicative assessment scale: A 94%, B 86%, C 79%, D 70%, E 60%, Fx <60% Scale of assessment (preliminary/final): 60/40	
Learning outcomes: The student will gain an overview of didactic theories, will be able to critically evaluate them and use the appropriate methods and forms. Through activities at the seminar, they will acquire modern teaching techniques that are a prevention of formal knowledge and misconceptions in mathematics. The study of scientific and research articles and the subsequent discussion or authentic experience will give graduates a better insight into the issues of inclusive school, creating preparations for the lesson (or sequence) and asking "good questions".	
Class syllabus: The language of mathematics, its historical development and didactic significance. A parallel between phylogeny and ontogeny of mathematical thinking. Conceptual and cognitive process in mathematics. Principles, means and forms of teaching in mathematics. Objectives of the teaching process in mathematics. Learning theories. Lesson preparation and its starting points. Resources and their use in preparation, during teaching in evaluation. Hypothetical learning trajectories.	
Recommended literature: Dítě, škola a matematika: Konstruktivistické přístupy k vyučování / Milan Hejný, František Kuřina. Praha : Portál, 2001 Moderní vyučování / George Petty Praha : Portál, 1993 Dvacet pět kapitol z didaktiky matematiky / Milan Hejný, Jarmila Novotná, Nad'a Stehlíková (Eds.) Praha, 2004	

Komunikácia v inkluzívnej škole / Marta Hornáková. Bratislava: Univerzita Komenského v Bratislave. 2017

Elementary and Middle School Mathematics: Teaching Developmentally. / John A. Van de Walle, Karen Karp, Jennifer M. Bay-Williams. Pearson.

Theory of didactical situations in mathematics /Guy Brousseau. Springer, 1997

Textbook explanations: Modes of reasoning in 7th grade Israeli mathematics textbooks. / Silverman B, and Even R., CERME 9. Charles University in Prague. Faculty of Education. 2015, pp.205-212

Od obsahu vzdelávání k žakově znalosti: Kritická místa na cestě do školy a ze školy / T. Janík, Arnica 8, 2018, 1–8. Západočeská univerzita v Plzni, Plzeň.

Refining teacher design capacity: Mathematics teachers' interactions with digital curriculum resources / Birgit Pepin, Ghislaine Gueudet, Luc Trouche. In. ZDM Mathematics Education, 2017, 49, 799–812 <https://doi.org/10.1007/s11858-017-0870-8>

Own electronic materials published via the subject's website (eg course in LMS Moodle)

Languages necessary to complete the course:

slovak, english

Notes:

Past grade distribution

Total number of evaluated students: 178

A	B	C	D	E	FX
93,82	3,93	0,56	0,56	0,0	1,12

Lecturers: doc. PaedDr. Mária Slavíčková, PhD.

Last change: 15.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2023/2024	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KDMFI/2-UMA-106/22	Course title: Didactics of Mathematics (3)
Educational activities: Type of activities: seminar Number of hours: per week: 4 per level/semester: 52 Form of the course: on-site learning	
Number of credits: 4	
Recommended semester: 3.	
Educational level: II., N	
Prerequisites:	
Course requirements: Continuous assessment: individual preparation of a lesson plan and its placement in the thematic plan, microteaching, preparation of written tests (2 equal groups), peer assessment, didactic analysis of teaching texts, reading and discussion of scientific articles. The student must obtain at least 50% of the continuous assessment and each assignment must be evaluated with a non-zero number of points. Exam: written with oral consultation Indicative assessment scale: A 94%, B 86%, C 79%, D 70%, E 60%, Fx <60% Scale of assessment (preliminary/final): 60/40	
Learning outcomes: The graduate of the course is acquainted with the goals of mathematics education at upper secondary schools, with adequate teaching methods, forms and means, with ways of introducing selected mathematical concepts, is ready for his work at school and outside school, can transfer to pedagogical practice knowledge and skills acquired in individual professional disciplines. Specially, the graduate of the course will gain an overview of didactic procedures for teaching mathematics suitable for the transition from lower to upper secondary school and in the first years of upper secondary school.	
Class syllabus: Specifics of the last year of lower secondary school, transition to the 1st year of upper secondary school. Appropriate activities of teaching mathematics for individual topics of the first and second year of upper secondary school: educational goals, activities, the assumption of the development of student understanding in the context of educational activities and the creation of their hypothetical scenario. Selection of adequate methods, forms and cognitively appropriate activities. Integration of digital technologies into the teaching of mathematics also in order to support argumentation, reasoning, and building a mathematical culture (correctness of concepts, procedures, arguments, etc.).	
Recommended literature:	

Dítě, škola a matematika: Konstruktivistické přístupy k vyučování / Milan Hejný, František Kuřina. Praha : Portál, 2001
 Moderní vyučování / Geoffrey Petty Praha : Portál, 1993
 Dvacet pět kapitol z didaktiky matematiky / Milan Hejný, Jarmila Novotná, Nad'a Stehnlíková (Eds.) Praha, 2004
 Thinking mathematically / John Mason, Leone Burton, Kaye Stacey. Pearson, 2010
 Explanation and Proof in Mathematics. Philosophical and Educational Perspectives / G. Hanna, H. N. Jahnke, H. Pulte (Eds.), Springer 2010
 Matematika a svet okolo nás : Zbierka úloh / Zbyněk Kubáček ... [et al.]. Bratislava : Pavol Cibulka, 2008
 Učebnice matematiky pre gymnáziá / Zbyněk Kubáček
 Matematika : 1 : zbierka úloh pre stredné školy / Iveta Kohanová ... [et al.]. Bratislava : Orbis Pictus Istropolitana, 2011
 Own electronic materials published via the subject's website (eg course in LMS Moodle)

Languages necessary to complete the course:

Notes:

Past grade distribution

Total number of evaluated students: 150

A	B	C	D	E	FX
70,0	18,67	8,67	2,67	0,0	0,0

Lecturers: doc. PaedDr. Mária Slavíčková, PhD., Mgr. Michaela Vargová, PhD.

Last change: 15.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2023/2024					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFI.KMANM/2- pUMA-901/19		Course title: Diploma Thesis Project			
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: 0					
Recommended semester: 4.					
Educational level: N					
Prerequisites:					
Course requirements:					
Learning outcomes:					
Class syllabus:					
Recommended literature:					
Languages necessary to complete the course:					
Notes:					
Past grade distribution Total number of evaluated students: 13					
A	B	C	D	E	FX
92,31	7,69	0,0	0,0	0,0	0,0
Lecturers: RNDr. Monika Dillingerová, PhD.					
Last change: 12.12.2022					
Approved by:					

COURSE DESCRIPTION

Academic year: 2023/2024					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFI.KAG/1-UMA-107/15		Course title: Geometry (1)			
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: I., N					
Prerequisites: FMFI.KAG/1-UMA-112/22 - Algebra and Theoretical Arithmetic (1) or FMFI.KAG/1-UMA-112/15 - Linear Algebra					
Course requirements: Preliminary assessment: homework (20%), written tests (40%) Final assessment: oral exam (40%) Grading: A 90%, B 80%, C 70%, D 60%, E 50%					
Learning outcomes: Master the analytical methods of studying the geometric properties of subspaces of n-dimensional affine (or Euclidean) space and its maps					
Class syllabus: - n-dimensional affine space A^n and Euclidean space E^n ; - coordinate systems; - affine maps; - orientation of affine space; - subspaces / linear varieties in E^n : parametric description and implicit equations, relative positions, distances and angles of some subspaces; - invariants of affine maps (fixed points, eigenvectors); - isometries, reflections as generators of the group of isometries of the Euclidean plane					
Recommended literature:					
Languages necessary to complete the course:					
Notes:					
Past grade distribution Total number of evaluated students: 214					
A	B	C	D	E	FX
22,43	15,89	22,43	13,55	17,29	8,41
Lecturers: doc. RNDr. Pavel Chalmovianský, PhD., RNDr. Jana Chalmovianská, PhD.					

Last change: 21.06.2022
Approved by:

COURSE DESCRIPTION

Academic year: 2023/2024					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFI.KAG/1-UMA-220/15		Course title: Geometry (2)			
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: I., N					
Prerequisites:					
Course requirements: Preliminary assessment: homework (20%), written tests (40%) Final assessment: oral exam (40%) Grading: A 90%, B 80%, C 70%, D 60%, E 50%					
Learning outcomes: The student gets familiar with the axiomatic construction of planimetry. He learns partly Euclid's, but especially Hilbert's axiomatic system. They will practice thorough mathematical argumentation and get knowledge of several models of different groups of axioms.					
Class syllabus: - history of axiomatics of geometry, Euclidean constructions - axioms of incidence, incidence geometry models - axioms of order, ordered plane models - axioms of congruence, theorems about the congruence of triangles, arithmetics of line segments and angles, Hilbert plane - controversy of the axiom of parallelism - axioms of continuity and circle continuity principles - some of Apollonius' problems					
Recommended literature:					
Languages necessary to complete the course:					
Notes:					
Past grade distribution Total number of evaluated students: 233					
A	B	C	D	E	FX
18,45	17,6	26,61	16,74	9,87	10,73
Lecturers: doc. RNDr. Pavel Chalmovianský, PhD., RNDr. Jana Chalmovianská, PhD.					

Last change: 21.06.2022
Approved by:

COURSE DESCRIPTION

Academic year: 2023/2024					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFI.KAG/1-UMA-301/22		Course title: Geometry (3)			
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: 4					
Recommended semester:					
Educational level: I., N					
Prerequisites:					
Course requirements: Preliminary assessment: homework Final assessment: written exam Grading: A 90%, B 80%, C 70%, D 60%, E 50%					
Learning outcomes: The main goal of the course is to strengthen the spatial imagination. The students learn the basics of polyhedral theory, the possibilities of displaying three-dimensional objects in a plane and also maps of two-dimensional spaces, which require embedding into three dimensions. They get practice in solving stereometric problems.					
Class syllabus: - introduction to theory of polyhedral, Euler's theorem, Platonic solids - incidence (sections of solids) and metric (distances and angles) problems in stereometry - principles of parallel projection, orthogonal projection (Monge projection), oblique projection - ellipse as an affine image of a circle - central projection, linear perspective, basics of projective space - non-linear projection: stereographic projection, other cartographic representations					
Recommended literature:					
Languages necessary to complete the course:					
Notes:					
Past grade distribution Total number of evaluated students: 194					
A	B	C	D	E	FX
29,9	22,68	17,53	13,92	7,73	8,25
Lecturers: doc. RNDr. Pavel Chalmovianský, PhD., RNDr. Jana Chalmovianská, PhD.					
Last change: 21.06.2022					

Approved by:

COURSE DESCRIPTION

Academic year: 2023/2024					
University: Comenius University Bratislava					
Faculty: Faculty of Mathematics, Physics and Informatics					
Course ID: FMFI.KDMFI/2-UMA-114/22		Course title: Non-traditional Forms of Teaching			
Educational activities: Type of activities: seminar Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning					
Number of credits: 2					
Recommended semester: 4.					
Educational level: II., N					
Prerequisites:					
Course requirements: seminar work / project Scale of assessment (preliminary/final): 100/0					
Learning outcomes: Students will be able to distinguish between different methods of education. They will have an overview of the principles and principles of each method and will be able to apply these principles in practice.					
Class syllabus: Flipped Classroom, Cooperative teaching, Brain-compatible teaching, method "Break", Realistic teaching (RME), Guided active learning, Jigsaw method, problem solving, rpg, simulation.					
Recommended literature:					
Languages necessary to complete the course: slovak, english					
Notes:					
Past grade distribution Total number of evaluated students: 24					
A	B	C	D	E	FX
95,83	0,0	0,0	4,17	0,0	0,0
Lecturers: RNDr. Monika Dillingerová, PhD.					
Last change: 17.03.2022					
Approved by:					

COURSE DESCRIPTION

Academic year: 2023/2024	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KMANM+KAG/2- UMA-211/22	Course title: Seminar in History of Mathematics (1)
Educational activities: Type of activities: seminar Number of hours: per week: 3 per level/semester: 39 Form of the course: on-site learning	
Number of credits: 2	
Recommended semester: 3.	
Educational level: II., N	
Prerequisites:	
Course requirements: Ongoing evaluation: presentation of the prepared lesson (20 points), preparation of the written exam for other participants (10 points), active participation in the evaluation of presentations and written exams of other participants (30 points). Grading: A (56-60 points), B (51-55 points), C (46-50 points), D (41-45 points), E (36-40 points), Fx (0-35 points). Weight of the ongoing / final assessment: 100/0 Scale of assessment (preliminary/final): 100/0	
Learning outcomes: Student will gain an overview of the various periods of development of mathematics in antiquity, including examples of problems solved in individual basic works.	
Class syllabus: Mathematics of ancient Egypt and Babylonia. Pre-Euclidean mathematics in ancient Greece. Euclid's Elements.	
Recommended literature: Dějiny matematiky / Dirk J. Struik ; přeložili Jaroslav Folta, Luboš Nový. Praha : Orbis, 1963 Dějiny matematiky ve starověku / Arnošt Kolman. Praha : Academia, 1968 Dějiny matematiky ve středověku / Adolf P. Juškevič. Praha : Academia, 1977 Dejiny matematiky / Ján Čižmár. Bratislava : Perfekt, 2020 The history of mathematics / Roger L. Cooke. Hoboken, NJ : John Wiley, 2003 The history of mathematics / David M. Burton, New York : McGraw-Hill, 2011	
Languages necessary to complete the course: Slovak, English	
Notes:	

Past grade distribution					
Total number of evaluated students: 155					
A	B	C	D	E	FX
63,23	30,32	5,81	0,65	0,0	0,0
Lecturers: doc. RNDr. Zbyněk Kubáček, CSc., prof. RNDr. Pavol Zlatoš, PhD.					
Last change: 24.06.2022					
Approved by:					

COURSE DESCRIPTION

Academic year: 2023/2024	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KMANM/2- UMA-212/15	Course title: Seminar in History of Mathematics (2)
Educational activities: Type of activities: seminar Number of hours: per week: 2 per level/semester: 26 Form of the course: on-site learning	
Number of credits: 2	
Recommended semester: 4.	
Educational level: II., N	
Prerequisites:	
Course requirements: Ongoing evaluation: presentation of the prepared lesson (20 points), preparation of the written exam for other participants (10 points), active participation in the evaluation of presentations and written exams of other participants (30 points). Grading: A (56-60 points), B (51-55 points), C (46-50 points), D (41-45 points), E (36-40 points), Fx (0-35 points). Weight of the ongoing / final assessment: 100/0 Scale of assessment (preliminary/final): 100/0	
Learning outcomes: The student will gain an overview of the various periods of mathematics development, including examples of problems solved in individual basic works.	
Class syllabus: Students will choose from the following topics: Ptolemy. Apollonius. Chinese and Arabic mathematics. Fibonacci. Alcuin's problems. Cardano's Ars Magna. Pascal's Arithmetic Triangle. Huygens's De Ratiociniis in Ludo Aleae. Bernoulli's Ars Conjectandi. Cavalieri's Geometry of indivisibles. Euler's Introductio and Letters to a German Princess. Venn's Symbolic Logic.	
Recommended literature: Matematika v proměnách věků III / Editori Jindřich Bečvář, Eduard Fuchs. Praha : Výzkumné centrum pro dějiny vědy, 2004 Dějiny matematiky / Dirk J. Struik ; přeložili Jaroslav Folta, Luboš Nový. Praha : Orbis, 1963 Dějiny matematiky ve starověku / Arnošt Kolman. Praha : Academia, 1968 Dějiny matematiky ve středověku / Adolf P. Juškevič. Praha : Academia, 1977 Dějiny matematiky / Ján Čižmár. Bratislava : Perfekt, 2020 The history of mathematics / Roger L. Cooke. Hoboken, NJ : John Wiley, 2003 The history of mathematics / David M. Burton, New York : McGraw-Hill, 2011	
Languages necessary to complete the course: Slovak, English	

Notes:					
Past grade distribution					
Total number of evaluated students: 151					
A	B	C	D	E	FX
90,07	9,27	0,0	0,66	0,0	0,0
Lecturers: doc. RNDr. Zbyněk Kubáček, CSc.					
Last change: 24.06.2022					
Approved by:					

COURSE DESCRIPTION

Academic year: 2023/2024							
University: Comenius University Bratislava							
Faculty: Faculty of Mathematics, Physics and Informatics							
Course ID: FMFI.KDMFI/2- pUMAx-211/19				Course title: Teaching Practice			
Educational activities: Type of activities: practice Number of hours: per week: per level/semester: 20s Form of the course: on-site learning, combined							
Number of credits: 0							
Recommended semester: 3.							
Educational level: N							
Prerequisites:							
Course requirements:							
Learning outcomes:							
Class syllabus:							
Recommended literature:							
Languages necessary to complete the course:							
Notes:							
Past grade distribution Total number of evaluated students: 49							
A	ABS	B	C	D	E	FX	NEABS
16,33	81,63	0,0	0,0	0,0	0,0	0,0	2,04
Lecturers: Mgr. Michaela Vargová, PhD., Mgr. Emília Mit'ková, PhD.							
Last change: 16.06.2023							
Approved by:							

STATE EXAM DESCRIPTION

Academic year: 2023/2024	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KDMFI/2- pUMA-911/19	Course title: Thesis Defence
Number of credits: 0	
Educational level: N	
State exam syllabus:	
Last change: 16.06.2023	
Approved by:	