OBSAH

COURSE INFORMATION SHEET

University: Catholic University in Ružomberok	
Faculty: Faculty of Education	
Course code: KMAT/Ma-BD103A/25	**Course title:** Algebraické štruktúry a polynomická algebra
Type and range of planned learning activities and teaching methods: **Form of instruction:** Lecture / Seminar **Recommended study range:** **hours weekly:** 2 / 2 **hours per semester:** 26 / 26 **Teaching method:** on-site	
Credits: 4	**Working load:** 100 hours
Recommended semester/trimester: 2.	
Level of study: I.	
Prerequisities: KMAT/Ma-BD101A/25	

Requirements for passing the course:

Total student workload: 100 hours. Contact hours 52 hours, ongoing weekly problem solving 24 hours, preparation for short tests 12 hours, preparation for oral exam 12 hours.

During the semester, students will be given homework examples every week and will write short tests – based on them and theoretical questions. They will also have a larger written test in the middle of the semester. The condition for participation in the exam is to earn at least half of the points from the total sum for the short tests and the larger written test. The exam consists of a written and oral part.

Course evaluation:

A - 100 % - 93 %, B - 92 % - 85 %, C - 84 % - 77 %, D - 76 % - 69 %, E - 68 % - 60 %,
Fx - 59 % - 0 %

Learning outcomes of the course:

Students will gain an in-depth understanding of basic concepts from the field of algebraic structures with one and two binary operations, i.e. from the areas of groups and rings, with special attention to their application in school mathematics. Students will gradually become familiar with concepts such as the residue classes of integers, then groupoids, semigroups, monoids and groups, and finally rings, integral domains, division rings and fields. They will also learn to present and distinguish examples of these algebras, mainly in school mathematics. They will become familiar with the key position of polynomials and polynomial functions in mathematics, with the connection and differences between them, with the divisibility of polynomials, with the roots of polynomial functions and their search, important statements and their connection with other parts of mathematics. Students will learn how to prove some mathematical theorems and apply them, and also solve exercises from the subject area.

Referring to the matrix of objectives and learning outcomes, upon completion of the course, students will have the following knowledge, skills, and competencies:

V4 He/she has basic knowledge of mathematical analysis, algebra, geometry, school stochastics and didactics of mathematics as the foundations of the profession of mathematics teacher.

Z2 He/she is able to think and argue critically.

Z3 He/she is able to estimate the strengths and weaknesses of things, to carry out mental experiments.

K4 He/she does not trust cheap and quick solutions to difficult problems.

K5 He/she is interested in what is going on in society, willing to work on oneself, enjoys solving problems, views phenomena of various kinds (natural, social, economic) with a reasonable distance.

Course contents:

1. Structures with one binary operation: groupoids, semigroups, monoids, groups. Connecting the solvability of simple equations in groups with school practice.
2. Classification of examples of algebraic structures with one binary operation.
3. Groups of symmetries of geometric figures and permutation groups. Cayley's theorem.
4. Isomorphisms of groupoids (groups) and classification of "small" groups with 1 - 15 elements.
5. Structures with two operations, rings, integral domains, division rings, fields, isomorphism of rings. Computation in integral domains in school practice.
6. Rings of polynomials and polynomial functions, connection and differences between them.
7. Divisibility of polynomials, the fundamental theorem of division with a remainder. The concept of the greatest common divisor of polynomials, Euclid's algorithm for its calculation.
8. Decompositions of polynomials into products of irreducibles, analogy of the fundamental theorem of arithmetic.
9. Roots of polynomial functions, Bezout's theorem. Multiple roots, Horner's scheme. The fundamental theorem of algebra and its variants. Irreducible polynomials over C.
10. Roots of polynomial functions over R and irreducible polynomials over R. Rational roots, necessary condition for the existence of rational roots (Eisenstein's criterion).

Recommended or required literature:

1. Haviar, M., Klenovčan, P.: Algebra I: Algebraické štruktúry. Banská Bystrica: Univerzita Mateja Bela. Skriptá. 1998.
2. Klenovčan, P.: Algebra II: Polynomická algebra. Banská Bystrica: Univerzita Mateja Bela. Skriptá. 2001.
3. Haviar, M., Klenovčan, P.: BASIC ALGEBRA for future teachers. (Revs. V. Janiš, M. Papčo), Belianum [2nd ed.], Banská Bystrica, 2020 - xvi, 390 pp.
4. Katriňák, T. a kol.: Algebra a teoretická aritmetika 1. Alfa, Bratislava 1985.
5. Šalát T. a kol.: Algebra a teoretická aritmetika 2. Alfa, Bratislava 1986.

Language of instruction:

Slovak

Notes:

Course evaluation:

Assessed students in total: 23

A	B	C	D	E	FX
17.39	26.09	21.74	17.39	4.35	13.04

Name of lecturer(s): prof. RNDr. Miroslav Haviar, CSc., doc. PaedDr. Martin Papčo, PhD.

Last modification: 23.09.2025

Supervisor(s):

Person responsible for the delivery, development and quality of the study programme:

doc. Mgr. Eva Litavcová, PhD.

COURSE INFORMATION SHEET

University: Catholic University in Ružomberok	
Faculty: Faculty of Education	
Course code: KMAT/Ma-BD102B/25	**Course title:** Chapters from theoretical arithemics
Type and range of planned learning activities and teaching methods: **Form of instruction:** Lecture / Seminar **Recommended study range:** **hours weekly:** 1 / 1 **hours per semester:** 13 / 13 **Teaching method:** on-site	
Credits: 3	**Working load:** 75 hours
Recommended semester/trimester: 5.	
Level of study: I.	
Prerequisities:	
Requirements for passing the course: Total student load: 75 hours. Contact hours 26 hours, continuous weekly problem solving 26 hours, exam preparation 9 hours, exam preparation 14 hours. During the semester, students will be given weekly homework assignments and will write short written flashcards from these assignments; the condition for participation in the exam is to score at least half of the total points for the flashcards. The exam consists of both written and oral parts. Course grade: A - 100 % - 93 %, B - 92 % - 85 %, C - 84 % - 77 %, D - 76 % - 69 %, E - 68 % - 60 %, Fx - 59 % - 0 %.	
Learning outcomes of the course: Course Goal: The goal of the course is to introduce students to the basic concepts of theoretical arithmetic, with particular attention to a deeper understanding of the conceptual framework and algorithms applied in school mathematics. Learning outcomes: Upon completion of the course, the student will acquire the following knowledge, skills and competences: An overview of the basic properties of natural, integer and rational numbers, an understanding of the concepts and the ability to apply the algorithms associated with the divisibility of integers, an understanding of the construction of number fields in school mathematics - the field of natural, integer, rational, real and complex numbers, an understanding of the notation of numbers in the positional p-adic system.	
Course contents: Cardinal and ordinal numbers - set decomposition, equivalence, cardinal number, ordering, ordinal number. Natural numbers - Peano set, definition of natural number, ordering, counting operations, number zero. Integers - definition, properties, construction of appropriate algebraic structure. Rational numbers - definition, properties, construction of the appropriate field.	

Real numbers - definition, properties, construction of the corresponding field.
Number systems. Rules of divisibility in decimal and other systems. Expression of real number by infinite decimal expansion. Approximate expression of a real number.
Complex numbers - definition, properties, construction of the corresponding field.

Recommended or required literature:

Hruša K. a kol.: Aritmetika a algebra pro pedagogické fakulty. I. DÍL ARITMETIKA. SPN, Praha 1964.
Hruša K. a kol.: ARITMETIKA pre pedagogické inštitúty. SPN, Bratislava 1961.
Znám Š.: Teória čísel, SPN Bratislava 1966.
Harminc M.: Elementárna teória čísel. UPJŠ, Košice 2003.
Kučera R., Skula L.: Číselné obory. Masarykova univerzita, Brno 1998.

Language of instruction:
Slovak

Notes:

Course evaluation:
Assessed students in total: 0

A	B	C	D	E	FX
0.0	0.0	0.0	0.0	0.0	0.0

Name of lecturer(s): doc. PaedDr. Martin Papčo, PhD., RNDr. Lucia Csachová, PhD.

Last modification: 25.06.2025

Supervisor(s):
Person responsible for the delivery, development and quality of the study programme:
doc. Mgr. Eva Litavcová, PhD.

COURSE INFORMATION SHEET

University: Catholic University in Ružomberok	
Faculty: Faculty of Education	
Course code: KMAT/Ma-BD115A/25	**Course title:** Didaktika matematiky pre bakalárov
Type and range of planned learning activities and teaching methods: **Form of instruction:** Lecture **Recommended study range:** **hours weekly:** 1 **hours per semester:** 13 **Teaching method:** on-site	
Credits: 1	**Working load:** 25 hours
Recommended semester/trimester: 5.	
Level of study: I.	
Prerequisities:	

Requirements for passing the course:

Verification of the degree of acquisition of the relevant knowledge, skills and competencies of the student is carried out on the basis of the development of tasks during the semester teaching of the subject. The student develops a logical-didactic analysis of the thematic unit of school mathematics (ISCED 2), for which he can receive a maximum of 40 points. For solving selected tasks from the T9 mathematics testing belonging to critical points of school mathematics, the student can receive 30 points, for analyzing their solution and possible reasons for the students' failure to solve them, also 30 points. The maximum number of points that can be obtained is 100. The minimum number of points obtained for a satisfactory assessment of the student's knowledge is 60.

Course evaluation:

A - 100% - 93%
B - 92% - 85%
C - 84% - 77%
D - 76% - 69%
E - 68% - 60%
Fx - 59% - 0%

Learning outcomes of the course:

The aim of the course is to expand and apply the acquired knowledge and skills from general didactics and pedagogy for the subject of mathematics. Theoretical and practical knowledge is applied in understanding the content and forms of teaching mathematics set out in the Innovative State Educational Programme (ISCED 2, ISCED 3). The student will become familiar with the objectives and contents of national and international testing and areas of mathematics in which Slovak pupils repeatedly fail. According to the current state, the student will become familiar with the use of ICT in teaching mathematics.

After completing the course, the student will acquire the following knowledge, skills and competences:

- The student applies knowledge from general pedagogy and didactics for the subject of mathematics.
- The student will develop a logical-didactic analysis of a thematic unit in school mathematics (ISCED 2).

- The student is familiar with the content and results of international and national testing in mathematics and their impact on school mathematics.
- The student solves selected tasks from the T9 mathematics test belonging to the critical points of school mathematics, analyzes their solutions and possible reasons for the students' failure to solve them.

With reference to the matrix of educational goals and outcomes, after completing the subject, the student will acquire the following knowledge, skills and competencies:

V3 The student has a rough overview of the methodology and epistemology of his/her subject specialization.

V4 The student has basic knowledge of mathematical analysis, algebra, geometry, school stochastics and mathematics didactics as the foundations of the profession of a mathematics teacher.

Z1 Under the supervision of an experienced teacher, he/she can organize, lead and analyze the educational process.

Z2 The student is able to think critically and argue.

Z3 The student can estimate the strengths and weaknesses of things, carry out mental experiments.

Z4 The student can present in a refined manner.

K1 The student is responsible for the safety and health protection of students.

K2 The student is able to respond promptly and appropriately quickly to students' academic results.

K3 The student is able to search for new professional information and process it independently.

Course contents:

1. National curriculum (ISCED 1, ISCED 2, ISCED 3) for mathematics
2. Mathematics teacher competences
3. Structure of mathematics lesson
4. Logical-didactic analysis of the thematic unit
5. Evaluation and classification in mathematics teaching
6. International and national mathematics testing
7. Critical points of school mathematics
8. Use of ICT in mathematics education

Recommended or required literature:

Csachová, L., Jurečková, M., Tkačik, Š. 2021. Kritické miesta školskej matematiky. Ružomberok: Verbum.

Hejný, M. a kol. 1990. Teória vyučovania matematiky 2. Bratislava: SPN.

Hejný, M., Novotná, J. & Stehlíková, N. 2004. Dvacetpět kapitol z didaktiky matematiky. Praha: Univerzita Karlova v Praze.

NIVAM. Testovanie T9 z matematiky. https://www2.nucem.sk/sk/merania/narodne-merania/testovanie-9

Petlák, E. 1997. Všeobecná didaktika. Bratislava.

Učebnice matematiky pre 2. stupeň základnej školy

Language of instruction:

Slovak language

Notes:

Course evaluation:

Assessed students in total: 17

A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0

Name of lecturer(s): RNDr. Lucia Csachová, PhD.

Last modification: 19.06.2025

Supervisor(s):

Person responsible for the delivery, development and quality of the study programme:

doc. Mgr. Eva Litavcová, PhD.

COURSE INFORMATION SHEET

University: Catholic University in Ružomberok	
Faculty: Faculty of Education	
Course code: KMAT/Ma-BD112A/25	**Course title:** Geometry within a Euclidean space
Type and range of planned learning activities and teaching methods: **Form of instruction:** Lecture / Seminar **Recommended study range:** **hours weekly:** 2 / 2 **hours per semester:** 26 / 26 **Teaching method:** on-site	
Credits: 4	**Working load:** 100 hours
Recommended semester/trimester: 5.	
Level of study: I.	
Prerequisities:	
Requirements for passing the course: Total student load: 100 hours. 52 contact hours. 24 hours - weekly continuous problem solving, preparation for written papers 12 hours, preparation for oral examination 12 hours. During the semester, students will be given weekly homework examples and will write short written flashcards from these and theoretical questions. The condition for participation in the exam is to score at least half of the total points for the flashcards. The examination consists of both written and oral parts. Course grade: A - 100 % - 93 %, B - 92 % - 85 %, C - 84 % - 77 %, D - 76 % - 69 %, E - 68 % - 60 %, Fx - 59 % - 0 %.	
Learning outcomes of the course: Course Goal: To master analytic methods for studying the basic concepts of n-dimensional Euclidean space, with special attention to the school geometry of 2- and 3-dimensional Euclidean space. Providing knowledge of sets of points defined by distance in the Euclidean plane and space. Learning Outcomes: Upon completion of this course, the student will have the following knowledge, skills and competencies: - The student knows and understands the basic definitions, has an idea of the correctness of the definition, can illustrate the definition with appropriate examples. - The student knows and understands basic mathematical theorems, has an idea of the meaning and logical structure of the theorem, can support the theorem with appropriate examples and counterexamples, can prove the theorem. - The student can solve basic types of problems, knows and can specifically use the computational procedures needed to solve a problem, can justify all steps in his/her solution of a problem. - The student can express him/herself in terms and symbols and can graphically illustrate reasoning with a picture when possible.	
Course contents:	

1. Scalar product and its properties. The outer product in n-dimensional vector space. Vector product in 3-dimensional vector space.
2. Euclidean space and its basic properties. Cartesian coordinate system.
3. Angle measure.
4. Distance of two points, distance of a point from subspace. Distance of two out-of-bounds subspaces. Deviation of two subspaces.
5. Relative position of subspaces En.
6. E2 and E3 subspaces.
7. Sets of points in the Euclidean plane defined by distance. Conics.

Recommended or required literature:

Sekanina, M. a kol.: Geometrie 1, SPN Praha 1986.
Hejný, M. – Zaťko, V. – Kršák, P.: Geometria 1, SPN Bratislava 1985.
Billich, M. – Trenkler, M.: Zbierka úloh z geometrie. Verbum, Ružomberok 2013.
Zlatoš P.: LINEÁRNA ALGEBRA A GEOMETRIA, Cesta z troch rozmerov s presahmi do príbuzných odborov. Bratislava 2011.

Language of instruction:
Slovak

Notes:

Course evaluation:
Assessed students in total: 15

A	B	C	D	E	FX
6.67	13.33	33.33	20.0	0.0	26.67

Name of lecturer(s): doc. PaedDr. Martin Papčo, PhD.

Last modification: 25.06.2025

Supervisor(s):
Person responsible for the delivery, development and quality of the study programme:
doc. Mgr. Eva Litavcová, PhD.

COURSE INFORMATION SHEET

University: Catholic University in Ružomberok	
Faculty: Faculty of Education	
Course code: KMAT/Ma-BD109A/25	**Course title:** Geometry within an affine space
Type and range of planned learning activities and teaching methods: **Form of instruction:** Lecture / Seminar **Recommended study range:** **hours weekly:** 2 / 1 **hours per semester:** 26 / 13 **Teaching method:** on-site	
Credits: 3	**Working load:** 75 hours
Recommended semester/trimester: 4.	
Level of study: I.	
Prerequisities:	
Requirements for passing the course: Total student load: 75 hours. 39 contact hours. 36 hours - weekly continuous problem solving 13 hours, preparation for written papers 12 hours, preparation for oral examination 11 hours. During the semester, students will be given weekly homework examples and will write short written flashcards from these and theoretical questions. The condition for participation in the exam is to score at least half of the total points for the flashcards. The examination consists of both written and oral parts. Course grade: A - 100 % - 93 %, B - 92 % - 85 %, C - 84 % - 77 %, D - 76 % - 69 %, E - 68 % - 60 %, Fx - 59 % - 0 %.	
Learning outcomes of the course: Course Goal: To master analytical methods for studying geometric properties of subspaces of n-dimensional affine and n-dimensional Euclidean space. Learning outcomes: Upon completion of this course, the student will have the following knowledge, skills and competencies: - The student knows and understands the basic definitions, has an idea of the correctness of the definition, can illustrate the definition with appropriate examples. - The student knows and understands basic mathematical theorems, has an idea of the meaning and logical structure of the theorem, can support the theorem with appropriate examples and counterexamples, can prove the theorem. - The student can solve basic types of problems, knows and can specifically use the computational procedures needed to solve a problem, can justify all steps in his/her solution of a problem. - The student can express him/herself in terms and symbols and, if possible, can graphically illustrate reasoning with a picture.	
Course contents: 1. Affine space and its basic properties. Linear coordinate system. Subspaces of affine space.	

2. Parametric and general equations of subspaces.
3. Relative position of two subspaces. Intersection and join of subspaces. The cross section of the extrasubspaces.
4. Non-parametric representation of subspaces.
5. Partition ratio. Ordering of points on a line and concepts based on it (half-space, half-line, line segment.) Convex sets. Angles.
6. Transformation of a linear coordinate system. Orientation of affine space.
7. Scalar product and its properties.

Recommended or required literature:

Sekanina, M. a kol.: Geometrie 1, SPN Praha 1986.
Hejný, M. – Zaťko, V. – Kršák, P.: Geometria 1, SPN Bratislava 1985.
Billich, M. – Trenkler, M.: Zbierka úloh z geometrie. Verbum, Ružomberok 2013.
Zlatoš P.: LINEÁRNA ALGEBRA A GEOMETRIA, Cesta z troch rozmerov s presahmi do príbuzných odborov. Bratislava 2011.

Language of instruction:
Slovak

Notes:

Course evaluation:
Assessed students in total: 20

A	B	C	D	E	FX
30.0	20.0	20.0	10.0	5.0	15.0

Name of lecturer(s): doc. PaedDr. Martin Papčo, PhD.

Last modification: 25.06.2025

Supervisor(s):
Person responsible for the delivery, development and quality of the study programme:
doc. Mgr. Eva Litavcová, PhD.

COURSE INFORMATION SHEET

University: Catholic University in Ružomberok	
Faculty: Faculty of Education	
Course code: KMAT/Ma-BD101A/25	**Course title:** Introduction to mathematics studies
Type and range of planned learning activities and teaching methods: **Form of instruction:** Seminar **Recommended study range:** **hours weekly:** 6 **hours per semester:** 78 **Teaching method:** on-site	
Credits: 5	**Working load:** 125 hours
Recommended semester/trimester: 1.	
Level of study: I.	
Prerequisities:	
Requirements for passing the course: During the semester, a student can earn a maximum of 50 points for midterm papers and submitted solutions to tasks that are assigned to students on an ongoing basis according to individual topics. Students can earn an additional 50 points for a written and oral exam. The maximum number of points that can be earned is 100. The minimum number of points earned for a satisfactory assessment of a student's knowledge is 60. Evaluation of the course: A – 100 % – 93 %, B – 92 % – 85 %, C – 84 % – 77 %, D – 76 % – 69 %, E – 68 % – 60 %, Fx – 59 % – 0 %	
Learning outcomes of the course: The aim of the course is to acquire various problem-solving methods, strategies and thought processes that can be used in solving standard and non-standard mathematical problems from school mathematics in primary and secondary schools. At the same time, the subject will also consolidate the content of secondary mathematics from the perspective of higher mathematics. Activities included in the subject will also be aimed at improving the student's mathematical communication skills, his ability to work when solving problems individually, in pairs or in a group. The tasks will be aimed not only at acquiring procedures for solving them, but also at improving logical and critical thinking. After completing the course, the student will acquire the following knowledge, skills and competencies: - The student has a comprehensive overview of the content of secondary school mathematics, which is an essential basis for university studies in mathematics teaching. - The student solves standard and non-standard problems of varying difficulty in school mathematics defined by the requirements for ISCED 2, ISCED 3 using various problem-solving methods and strategies. - The student can assess the correctness, suitability and effectiveness of various procedures in solving different types of mathematical problems. - The student is able to create variations of mathematical problems and problems of varying difficulty levels. With reference to the matrix of learning objectives and outcomes, after completing the course, the student will acquire the following knowledge, skills and competencies:	

V3 Has a rough overview of the methodology and epistemology of his/her subject specialization.
Z2 Is able to think critically and argue.
Z3 Can estimate the strengths and weaknesses of things, carry out mental experiments.
Z4 Can present in a refined manner.
K3 Is able to search for new professional information and process it independently.
K4 Does not trust cheap and quick solutions to difficult tasks.
K5 Is interested in what is happening in society, has a desire to work on himself, enjoys solving problems, views phenomena of various kinds (natural, social, economic) with a reasonable distance.

Course contents:

1. The solving process of (mathematical) problems according to G. Pólya, phases of solving process. Strategies for solving problems in school mathematics.
2. General strategies for solving problems in school mathematics.
3. Functions, composition of functions, inverse function.
4. Binary relations on a set, equivalence relation, partial ordering.
5. Integers division, Theorem of Division with Remainder, Fundamental Theorem of Arithmetic, Divisibility Criteria.
6. Greatest common divisor, Least common multiple, Euclidean algorithm.
7. Numerical and algebraic expressions, their modification and operations with them
8. Elementary functions
9. Definitional domain and domain of values of a function
10. Equations and inequalities I
11. Equations and inequalities II
12. Heuristic methods in mathematics

Recommended or required literature:

1. Hecht, T., Sklenáriková, Z.: Metódy riešenia matematických úloh. Bratislava: SPN, 1992. 80-08-00340-5
2. Katriňák, T. a kol.: Algebra a teoretická aritmetika 1. Bratislava: Alfa, 1985. 63-568-85
3. Klenovčan, P., Haviar, Š., Haviar, M.: Úvod do štúdia matematiky. Banská Bystrica: Univerzita Mateja Bela, 1996. 8080550107
4. Kopka, J.: Ako riešiť matematické problémy. Ružomberok: Verbum, 2010. ISBN 978-80-8084-563-6
5. Kopka, J.: Metoda zkoumání ve školské matematice. Ružomberok: Katolícka univerzita, 2008. ISBN 978-80-808-4390-8
6. Lengyelfalusy, T., Horváthová, K.: Metódy riešenia matematických úloh I. a II. Žilina: Edis, 2016. ISBN 978-80-554-0109-6
7. Novotná, J.: Analýza řešení slovních úloh. Praha: Univerzita Karlova v Praze – Pedagogická fakulta, 2000. ISBN 80-7290-011-0
8. Petáková, J.: Matematika (Příprava k maturitě a k přijímacím zkouškám na vysoké školy). Praha: Prometheus, 2008. ISBN 8071960993
9. Polya, G.: Jak to řešit? Praha: Matfyzpres. 2016. ISBN 978-80-7378-325-9
10. Vondrová, N. a kol.: Matematická slovná úloha. Medzi matematikou, jazykem a psychológii. Praha: Karolinum, 2019. ISBN 978-80-246-4516-2.
11. Učebnice matematiky pre stredné školy, zbierky úloh.

Language of instruction:

Slovak language

Notes:

Course evaluation:
Assessed students in total: 25

A	B	C	D	E	FX
44.0	8.0	12.0	20.0	8.0	8.0

Name of lecturer(s): RNDr. Lucia Csachová, PhD.

Last modification: 19.06.2025

Supervisor(s):
Person responsible for the delivery, development and quality of the study programme:
doc. Mgr. Eva Litavcová, PhD.

COURSE INFORMATION SHEET

University: Catholic University in Ružomberok	
Faculty: Faculty of Education	
Course code: KMAT/Ma-BD101B/25	**Course title:** Kapitoly z teórie množín
Type and range of planned learning activities and teaching methods: **Form of instruction:** Lecture / Seminar **Recommended study range:** **hours weekly:** 1 / 1 **hours per semester:** 13 / 13 **Teaching method:** on-site	
Credits: 3	**Working load:** 75 hours
Recommended semester/trimester: 1.	
Level of study: I.	
Prerequisities:	
Requirements for passing the course: Total student workload: 75 hours. Contact hours 26 hours, ongoing weekly problem solving 26 hours, preparation for tests 9 hours, preparation for exam 14 hours. A student can earn a maximum of 40 points during the semester for mid-term tests (in daily form). Each week, students are given separate tasks to solve, for which they can also earn points. Students earn an additional 60 points for practical and theoretical knowledge of the given topics. The maximum number of points that can be obtained is 100. The minimum number of points obtained for a satisfactory assessment of the student's knowledge is 60. Subject evaluation: A – 100 % – 93 %, B – 92 % – 85 %, C – 84 % – 77 %, D – 76 % – 69 %, E – 68 % – 60 %, Fx – 59 % – 0 %	
Learning outcomes of the course: The aim of the course is to familiarize students with the mathematical concept of infinity, the classification of relationships between objects through the concept of relation. Learning outcomes: After completing the course, the student will acquire the following knowledge, skills and competencies: # Overview of the historical development of set theory # Axiomatic construction of set theory # Basic understanding of the mathematical concept of infinity and also the classification of infinity	
Course contents: 1. The Zermelo-Fraenkel axiomatic system of set theory. 2. Relations and mappings. 3. The concept of cardinality of a set. 4. Finite and countable sets. 5. Cardinality of the continuum. Cantor's diagonal. 6. Foundations of cardinal arithmetic. 7. The axiom of choice, its equivalents and consequences.	

Recommended or required literature:

1. Bukovský, L. : Množiny a všeličo okolo nich, ES UPJŠ, Košice, 2005.
2. Sochor, A. : Logika pro všechny ochotné myslet. Karolinum. Praha, 2012.
3. Sleziak, M. : Teória množín pre učiteľov. Elektronický učebný text. 2021.

Language of instruction:

slovak language

Notes:

Course evaluation:

Assessed students in total: 0

A	B	C	D	E	FX
0.0	0.0	0.0	0.0	0.0	0.0

Name of lecturer(s): Mgr. Peter Mlynárčik, PhD.

Last modification: 12.06.2025

Supervisor(s):

Person responsible for the delivery, development and quality of the study programme:

doc. Mgr. Eva Litavcová, PhD.

COURSE INFORMATION SHEET

University: Catholic University in Ružomberok	
Faculty: Faculty of Education	
Course code: KMAT/Ma-BD100B/25	**Course title:** Language of mathematics
Type and range of planned learning activities and teaching methods: **Form of instruction:** Lecture / Seminar **Recommended study range:** **hours weekly:** 1 / 1 **hours per semester:** 13 / 13 **Teaching method:** on-site	
Credits: 3	**Working load:** 75 hours
Recommended semester/trimester: 1.	
Level of study: I.	
Prerequisities:	
Requirements for passing the course: Total student workload: 75 hours. Contact hours 26 hours, ongoing weekly problem solving 26 hours, preparation for tests 9 hours, preparation for exam 14 hours. Verification of the degree of acquisition of relevant knowledge, skills and competencies of the student is carried out on the basis of theoretical and practical examinations during the semester teaching of the subject (40%) and the final exam (60%). Subject evaluation: A – 100 % – 93 %, B – 92 % – 85 %, C – 84 % – 77 %, D – 76 % – 69 %, E – 68 % – 60 %, Fx – 59 % – 0 %	
Learning outcomes of the course: The aim of the course is to provide students with basic knowledge of mathematical logic and the language of set theory in order to enable them to gain a deeper understanding of mathematical theory in their further studies, as well as to practice typical methods of proof. After completing the course, the student will acquire the following knowledge, skills and competencies: # Overview of the historical development of mathematics # Basic knowledge of mathematical logic, which leads to a deeper understanding of mathematical theory # Use the basic rules of logical proof # Basic knowledge of set theory # Apply the consequences of the axioms of real numbers	
Course contents: 1. General introduction to language 2. Historical view of the development of mathematics 3. Propositional logic 4. Semantics of propositional logic 5. Syntax of propositional logic (mathematical proofs) 6. Sets and their properties 7. Operations with sets	

8. Natural numbers and mathematical induction
9. Real numbers, axioms of real numbers and their consequences
10. Quantified propositions and their negation
11. Relations, mappings, partial ordering of sets and equivalence.
12. Finite and countable sets
13. Dirichlet's principle

Recommended or required literature:

Odporúčaná literatúra:

1. Čižmár, J.: Dejiny matematiky, Bratislava 2017, ISBN 2017978-80-8046-829-3
2. Bukovský, L.:Množiny a všeličo okolo nich, UPJŠ Košice 2005, ISBN 80-7097-578-4
3. Draženská, E., Myšková H.: Matematická logika, TUKE Košice 2014, ISBN 978-80-553-1821-9
4. Lučíková, J.: Logika ako popis spôsobu uvažovania, bakalárska práca, UNIPO Prešov 2021
5. Smullyan R.: Jak sej menuje tahle knížka ?, Portál 2015
6. Vopěnka, P.: Rozpravy s geometrií.
7. Devlin, K.: Jazyk matematiky, 2011, ISBN 978-80-7363-364-6
8. Kvasnička, V., Pospíchal, J.: Matematická logika, STU Bratislava 2006, ISBN 80-227-2449-1
9. Fuchs, E.:Teorie množin pro učitele, Brno 1999, ISBN 80-210-2201-9

Language of instruction:

slovak language

Notes:

Course evaluation:

Assessed students in total: 33

A	B	C	D	E	FX
18.18	21.21	15.15	18.18	9.09	18.18

Name of lecturer(s): Mgr. Peter Mlynárčik, PhD.

Last modification: 12.06.2025

Supervisor(s):

Person responsible for the delivery, development and quality of the study programme:

doc. Mgr. Eva Litavcová, PhD.

COURSE INFORMATION SHEET

University: Catholic University in Ružomberok	
Faculty: Faculty of Education	
Course code: KMAT/Ma-BD106A/25	**Course title:** Linear Algebra
Type and range of planned learning activities and teaching methods: **Form of instruction:** Lecture / Seminar **Recommended study range:** **hours weekly:** 2 / 2 **hours per semester:** 26 / 26 **Teaching method:** on-site	
Credits: 4	**Working load:** 100 hours
Recommended semester/trimester: 3.	
Level of study: I.	
Prerequisities:	
Requirements for passing the course: Total student workload: 100 hours. Contact hours 52 hours, ongoing weekly problem solving 24 hours, preparation for short tests 12 hours, preparation for oral exam 12 hours. During the semester, students will be given homework examples every week and will write short tests based on them and theoretical questions. They will also have a larger written test in the middle of the semester. The condition for participation in the exam is to earn at least half of the points from the total for the short tests and for the larger written test. The exam consists of a written and oral part. Course evaluation: A - 100 % - 93 %, B - 92 % - 85 %, C - 84 % - 77 %, D - 76 % - 69 %, E - 68 % - 60 %, Fx - 59 % - 0 %	
Learning outcomes of the course: n the first part of the course, students will become familiar with matrices, systems of linear equations, matrix invertibility criteria, and matrix determinants. The focus of the second part of the course is on finite-dimensional vector spaces, their examples with an emphasis on examples from school practice, and subspaces generated by sets of vectors. This is followed by linear dependence of vectors, the concept of a basis, Steinitz's theorem, and the concept of the dimension of a vector space. Linear mappings between vector spaces, their examples, and their connection with matrices will be discussed. The kernel and image of a linear mapping will be defined. Students will learn how to prove mathematical theorems, apply them, and solve problems from the subject area. Referring to the matrix of objectives and learning outcomes, upon completion of the course, the student will acquire the following knowledge, skills and competencies: V4 He/she has a basic knowledge of mathematical analysis, algebra, geometry, school stochastics and didactics of mathematics as the foundations of the profession of mathematics teacher. Z2 He/she is able to think and argue critically. Z3 He/she is able to estimate the strengths and weaknesses of things, to carry out mental experiments. K4 He/she does not trust cheap and quick solutions to difficult problems. K5 He/she is interested in what is going on in society, willing to work on oneself, enjoys solving problems, views phenomena of various kinds (natural, social, economic) with a reasonable distance.	

Course contents:

1. Matrices, operations with matrices, inverse and transpose of matrices, special types of matrices.
2. Homogeneous and non-homogeneous systems of linear equations and their solvability.
3. Systems of linear equations and invertible matrices.
4. Determinants, their calculation and properties.
5. Applications of determinants, Cramer's rule.
6. Vector spaces and subspaces, their examples. Subspaces generated by sets of vectors.
7. Finite-dimensional spaces. Linear dependence and independence, basis, dimension.
8. Solution spaces of homogeneous systems. Finding homogeneous systems whose solution is a given subspace.
9. Relations between finite-dimensional vector spaces, matrices and systems of linear equations and transitions between them.
10. Linear mappings between vector spaces and their relation to matrices.

Recommended or required literature:

1. Haviar, M.: Algebra III: Lineárna algebra. Banská Bystrica: Univerzita Mateja Bela, 2001.
2. Haviar, M. - Klenovčan, P.: BASIC ALGEBRA for future teachers (Revs. V. Janiš, M. Papčo), Belianum [2nd ed.], Banská Bystrica, 2020.
3. Katriňák, T. a kol.: Algebra a teoretická aritmetika 1. Alfa, Bratislava 1985.

Language of instruction:

Slovak

Notes:

Course evaluation:

Assessed students in total: 13

A	B	C	D	E	FX
30.77	23.08	30.77	15.38	0.0	0.0

Name of lecturer(s): prof. RNDr. Miroslav Haviar, CSc., doc. PaedDr. Martin Papčo, PhD.

Last modification: 23.09.2025

Supervisor(s):

Person responsible for the delivery, development and quality of the study programme:

doc. Mgr. Eva Litavcová, PhD.

COURSE INFORMATION SHEET

University: Catholic University in Ružomberok	
Faculty: Faculty of Education	
Course code: KMAT/Ma-BD104A/25	**Course title:** Matematická analýza 1 - Príprava na diferenciálny a integrálny počet
Type and range of planned learning activities and teaching methods: **Form of instruction:** Lecture / Seminar **Recommended study range:** **hours weekly:** 2 / 1 **hours per semester:** 26 / 13 **Teaching method:** on-site	
Credits: 4	**Working load:** 100 hours
Recommended semester/trimester: 2.	
Level of study: I.	
Prerequisities: KMAT/Ma-BD101A/25	

Requirements for passing the course:

Total student workload: 100 hours.

Contact hours 39 hours, ongoing weekly problem solving 22 hours, preparation for papers 20 hours, preparation for oral exam 19 hours.

During the semester, there will be two written tests during the exercises, usually in the 6th and 12th weeks. In addition, homework assignments will be assigned every week and students will sporadically write short essays - flashcards; To participate in the exam, it is necessary to obtain at least 20 points from the tests and flashcards. In the final exam, consisting of a written and oral part, the student can obtain a maximum of 60 points. The maximum number of points that can be obtained is 100. The minimum number of points obtained for a satisfactory assessment of the student's knowledge is 60.

Learning outcomes of the course:

The subject is an introductory course in mathematical analysis. The aim of the subject is to teach students to work systematically with the conceptual apparatus given axiomatically, to teach them basic concepts related to the study of the properties of functions and to prepare them for the study of differential and integral calculus of functions of one variable.

After completing the subject, the student:

– has basic knowledge of real numbers, sequences and real functions of one real variable,

– can formulate relevant mathematical statements and explain the methods of their proof,

– can analyze problems related to the topic being studied,

– has the skill to determine the supremum and infimum of a set and a function, can decide on the convergence of a sequence and find its limit,

– has basic knowledge of the continuity of a function, proper and improper limits of a function at proper and improper points,

– knows the basic properties of elementary functions.

With reference to the matrix of educational objectives and outcomes, after completing the course, the student will acquire the following knowledge, skills and competencies:

V4 Has basic knowledge of mathematical analysis, algebra, geometry, school stochastics and mathematics didactics as the foundations of the profession of a mathematics teacher.

Z2 Is able to think critically and argue.

Z3 Can estimate the strengths and weaknesses of things, carry out mental experiments.

K4 Does not trust cheap and quick solutions to difficult tasks.
K5 Is interested in what is happening in society, has a desire to work on himself, enjoys solving problems, views phenomena of various kinds (natural, social, economic) with a reasonable distance.

Course contents:
1. Definition of real numbers. Axioms of real numbers. Consequences of the axioms of addition and multiplication. Theorem of mathematical induction. Consequences of the axioms of ordering.
2. Power with an integer exponent. Absolute value, Interval, neighborhood of a point, improper numbers. Consequences of the axiom of upper limit.
3. Other properties of real numbers. Power with a real exponent. Logarithm.
4. Definition of a sequence of numbers. Limit of a sequence. Boundedness of a sequence.
5. Operations with convergent sequences. Improper limit.
6. Monotone sequences. Selected sequences. Fundamental sequences. Mass point of a sequence.
7. The concept of a function of a real variable. Operations with functions. Some special classes of functions. Inverse function.
8. Limit of a function. Limit theorems.
9. Different types of limits.
10. Continuous functions – continuity at a point.
11. Continuity on a set. Weierstrass theorems. Bolzano's theorem and other properties of functions continuous on a set.
12. Elementary functions.
13. Some important limits of functions.

Recommended or required literature:
1. Mihalíková, B., Ohriska, J.: Mathematical Analysis I (script), UPJŠ Košice, 2012, ISBN 978-80-7097-963-1.
2. Eliáš J., Horváth J., Kajan: Collection of Problems in Higher Mathematics 2, STU, Bratislava 1995, ISBN 8022707422.
3. Demidovič, B. P.: Collection of Problems and Exercises in Mathematical Analysis, Fragment, Prague, 2003, ISBN 8072005871.
4. Jarník, V.: Differential Calculus I, Academia, Prague 1955.
5. Jarník, V.: Differential Calculus II, Academia, Prague 1976.
6. Kluvánek, I.: Differential Calculus of a Function of One Real Variable, PF KU, Ružomberok 2007, ISBN 978-80-8084-236-9.
7. Kluvánek, I.: Integral number of a function of one real variable, PF KU, Ružomberok 2008, ISBN 978-80-8084-373-1.
8. Veselý, J.: Mathematical analysis for teachers I, Matfyzpress, 2001, Prague, 230 p., ISBN 80-85863-62-6 : 180
9. Veselý, J.: Mathematical analysis for teachers II, Matfyzpress, 2001, Prague, 190 p., ISBN,978-80-7378-063-0.

Language of instruction:
Slovak

Notes:

Course evaluation:
Assessed students in total: 21

A	B	C	D	E	FX
0.0	9.52	9.52	42.86	19.05	19.05

Name of lecturer(s): doc. Mgr. Eva Litavcová, PhD.

Last modification: 22.09.2025
Supervisor(s): **Person responsible for the delivery, development and quality of the study programme:** doc. Mgr. Eva Litavcová, PhD.

COURSE INFORMATION SHEET

University: Catholic University in Ružomberok	
Faculty: Faculty of Education	
Course code: KMAT/Ma-BD107A/25	**Course title:** Matematická analýza 2 - Diferenciálny počet
Type and range of planned learning activities and teaching methods: **Form of instruction:** Lecture / Seminar **Recommended study range:** **hours weekly:** 2 / 2 **hours per semester:** 26 / 26 **Teaching method:** on-site	
Credits: 4	**Working load:** 100 hours
Recommended semester/trimester: 3.	
Level of study: I.	
Prerequisities:	
Requirements for passing the course: Total student workload: 100 hours. Contact hours 52 hours, ongoing weekly problem solving 17 hours, preparation for papers 16 hours, preparation for oral exam 15 hours. During the semester, there will be two written tests during the exercises, usually in the 6th and 12th weeks. In addition, homework assignments will be assigned every week and students will sporadically write short essays - flashcards; To participate in the exam, it is necessary to obtain at least 20 points from the tests and flashcards. In the final exam, consisting of a written and oral part, the student can obtain a maximum of 60 points. The maximum number of points that can be obtained is 100. The minimum number of points obtained for a satisfactory assessment of the student's knowledge is 60.	
Learning outcomes of the course: The aim of the course is to provide students with the ability to master the differential calculus of real functions of one real variable. The aim is also for the student to learn how to describe exponential, logarithmic, trigonometric and cyclometric functions using power series and how and why such an approach can be used effectively. After completing the course, the student: # has basic knowledge of differential calculus of a real function of one real variable and, through this apparatus, the skill to describe some properties of functions, # can formulate relevant mathematical statements and explain methods of their proof, # can analyze tasks related to the topic being studied, # can formulate theorems on the increment of a function and apply them to specific examples, can investigate the course of a function and can apply differential calculus when calculating limits of functions, # can find the nth Taylor polynomial of a function at a given point, can determine the functional value of a function in the vicinity of a given point with a specified accuracy, # has basic knowledge of number series, can investigate the convergence of a number series, # has basic knowledge of functional sequences and series, can investigate the convergence of a functional sequence and functional series, # has basic knowledge of power sequences and series, can use Taylor's theorem to expand a function into a power series,	

can describe exponential, logarithmic, trigonometric and cyclometric functions through power series.
With reference to the matrix of educational objectives and outcomes, after completing the course, the student will acquire the following knowledge, skills and competencies:
V4 Has basic knowledge of mathematical analysis, algebra, geometry, school stochastics and mathematics didactics as the foundations of the profession of a mathematics teacher.
Z2 Is able to think critically and argue.
Z3 Can estimate the strengths and weaknesses of things, carry out mental experiments.
K3 Is able to search for new professional information and process it independently.
K4 Does not trust cheap and quick solutions to difficult tasks.
K5 Is interested in what is happening in society, has a desire to work on oneself, enjoys solving problems, views phenomena of various kinds (natural, social, economic) with a reasonable distance.

Course contents:
1. Derivative of a function. Differential of a function.
2. Basic rules for calculating the derivative.
3. Derivative and higher-order differential. Basic theorems of differential calculus.
4. Use of differential calculus in investigating the properties of functions. Monotonicity of a function. Extrema of a function. Convexity and concavity of a function. Inflection points.
5. Asymptotes. Course of a function. L'Hospital's rules.
6. Taylor polynomial, Taylor's theorem.
7. Infinite numerical series and its convergence. Operations with numerical series.
8. Criteria for series with non-negative terms. Absolute and relative convergence of a series. Criteria for series with real terms.
9. Functional sequences and series. Convergence of functional sequences and series.
10. Criteria for uniform convergence. Properties of functional sequences and series.
11. Power series. Domain of convergence.
12. Properties of power series. Taylor series.
13. Description of elementary functions by means of power series.

Recommended or required literature:

1. Mihalíková, B., Ohriska, J.: Mathematical Analysis I (script), UPJŠ Košice, 2012, ISBN 978-80-7097-963-1.
2. Mihalíková, B., Hutník, O., Kiseľák, J.: Mathematical Analysis III (script), UPJŠ Košice, 2021, ISBN 978-80-8152-993-1.
3. Eliáš J., Horváth J., Kajan: Collection of Problems in Higher Mathematics 2, STU, Bratislava 1995, ISBN 8022707422.
4. Demidovič, B. P.: Collection of Problems and Exercises in Mathematical Analysis, Fragment, Prague, 2003, ISBN 8072005871.
5. Jarník, V.: Differential Calculus I, Academia, Prague 1955.
6. Jarník, V.: Differential Calculus II, Academia, Prague 1976.
7. Jarník, V.: Integral Calculus I, Academia, Prague 1974.
8. Jarník, V.: Integral Calculus II, Academia, Prague 1976.
9. Kluvánek, I.: Differential Calculus of a Function of One Real Variable, PF KU, Ružomberok 2007, ISBN 978-80-8084-236-9.
10. Kluvánek, I.: Integral number of a function of one real variable, PF KU, Ružomberok 2008, ISBN 978-80-8084-373-1.
11. Veselý, J.: Mathematical analysis for teachers I, Matfyzpress, 2001, Prague, 230 p., ISBN 80-85863-62-6 : 180
12. Veselý, J.: Mathematical analysis for teachers II, Matfyzpress, 2001, Prague, 190 p., ISBN 978-80-7378-063-0.

Language of instruction:
Slovak

Notes:

Course evaluation:
Assessed students in total: 13

A	B	C	D	E	FX
0.0	7.69	23.08	23.08	38.46	7.69

Name of lecturer(s): doc. Mgr. Eva Litavcová, PhD.

Last modification: 22.09.2025

Supervisor(s):
Person responsible for the delivery, development and quality of the study programme:
doc. Mgr. Eva Litavcová, PhD.

COURSE INFORMATION SHEET

University: Catholic University in Ružomberok	
Faculty: Faculty of Education	
Course code: KMAT/Ma-BD110A/25	**Course title:** Matematická analýza 3 - Integrálny počet
Type and range of planned learning activities and teaching methods: **Form of instruction:** Lecture / Seminar **Recommended study range:** **hours weekly:** 2 / 1 **hours per semester:** 26 / 13 **Teaching method:** on-site	
Credits: 3	**Working load:** 75 hours
Recommended semester/trimester: 4.	
Level of study: I.	
Prerequisities:	
Requirements for passing the course: Total student workload: 75 hours. Contact hours 39 hours, ongoing weekly problem solving 13 hours, preparation for papers 12 hours, preparation for oral exam 11 hours. During the semester, there will be two written tests during the exercises, usually in the 6th and 12th weeks. In addition, homework assignments will be assigned every week and students will sporadically write short essays - flashcards; To participate in the exam, it is necessary to obtain at least 20 points from the tests and flashcards. In the final exam, consisting of a written and oral part, the student can obtain a maximum of 60 points. The maximum number of points that can be obtained is 100. The minimum number of points obtained for a satisfactory assessment of the student's knowledge is 60.	
Learning outcomes of the course: The aim of the course is to provide students with basic concepts from the field of integral calculus of real functions of one real variable. The student should learn to integrate and learn how to use integral calculus to calculate the areas, volumes and surfaces of some geometric figures and the lengths of curves, and also how to solve some phenomena/problems in the natural sciences by solving differential equations. Learning outcomes: After completing the course, the student: – has basic knowledge of primitive functions and the skill of calculating them, – has basic knowledge of the Riemann integral, – understands the concept of the mean value of a function on an interval, – can apply the integral to calculate the area, volume and surface of various geometric figures and the lengths of curves, – can investigate the convergence of an improper integral, – can formulate relevant mathematical statements and explain the methods of their proof, – can analyze tasks related to the topic being covered, – has the conceptual apparatus for solving some types of differential equations. With reference to the matrix of educational objectives and outcomes, after completing the course, the student will acquire the following knowledge, skills and competencies:	

V4 Has basic knowledge of mathematical analysis, algebra, geometry, school stochastics and mathematics didactics as the foundations of the profession of a mathematics teacher.
Z2 Is able to think critically and argue.
Z3 Can estimate the strengths and weaknesses of things, carry out mental experiments.
K3 Is able to search for new professional information and process it independently.
K4 Does not trust cheap and quick solutions to difficult tasks.
K5 Is interested in what is happening in society, has a desire to work on oneself, enjoys solving problems, views phenomena of various kinds (natural, social, economic) with a reasonable distance.

Course contents:
1. Primitive function and its properties. Basic integration methods.
2. Integration of rational functions.
3. Integration of some irrational functions. Integration of trigonometric and some transcendental functions.
4. Riemann's sum definition of a definite integral.
5. A definite integral as the limit of a sequence of integral sums. Basic properties of a definite integral.
6. An integral as a function of an upper limit. Integrability of functions.
7. Basic methods of calculating definite integrals. Mean value of a function on an interval.
8. Geometric applications of a definite integral.
9. Improper integral. Properties and methods of calculating an improper integral.
10. Convergence of an improper integral.
11. Applications of the integral in solving simple first-order differential equations.

Recommended or required literature:
1. Mihalíková, B., Ohriska, J.: Mathematical Analysis II (script), ES UPJŠ Košice, 2007, 978-80-7097-686-9.
2. Eliáš J., Horváth J., Kajan: Collection of Problems in Higher Mathematics 2, STU, Bratislava 1995, ISBN 8022707422.
3. Demidovič, B. P.: Collection of Problems and Exercises in Mathematical Analysis, Fragment, Prague, 2003, ISBN 8072005871.
4. Jarník, V.: Differential Calculus I, Academia, Prague 1955.
5. Jarník, V.: Differential Calculus II, Academia, Prague 1976.
6. Jarník, V.: Integral Calculus I, Academia, Prague 1974.
7. Jarník, V.: Integral Calculus II, Academia, Prague 1976.
8. Kluvánek, I.: Differential Calculus of a Function of One Real Variable, PF KU, Ružomberok 2007, ISBN 978-80-8084-236-9.
9. Kluvánek, I.: Integral number of a function of one real variable, PF KU, Ružomberok 2008, ISBN 978-80-8084-373-1.
10. Veselý, J.: Mathematical analysis for teachers I, Matfyzpress, 2001, Prague, 230 p., ISBN 80-85863-62-6 : 180
11. Veselý, J.: Mathematical analysis for teachers II, Matfyzpress, 2001, Prague, 190 p., ISBN,978-80-7378-063-0.

Language of instruction:
Slovak

Notes:

Course evaluation:
Assessed students in total: 16

A	B	C	D	E	FX
18.75	0.0	18.75	31.25	31.25	0.0

Name of lecturer(s): doc. Mgr. Eva Litavcová, PhD.

Last modification: 22.09.2025

Supervisor(s):
Person responsible for the delivery, development and quality of the study programme:
doc. Mgr. Eva Litavcová, PhD.

COURSE INFORMATION SHEET

University: Catholic University in Ružomberok

Faculty: Faculty of Education

Course code: KMAT/Ma-BD100S/25	**Course title:** Mathematics

Type and range of planned learning activities and teaching methods:
Form of instruction:
Recommended study range:
hours weekly: **hours per semester:**
Teaching method: on-site

Credits: 5	**Working load:** 125 hours

Recommended semester/trimester: 5., 6..

Level of study: I.

Prerequisities:

Requirements for passing the course:
The state examination in the regular term, determined by the study schedule, may be taken by a student who has fulfilled the obligations stipulated by the accredited study programme and the Study Regulations of the KU in Ružomberok during the study control carried out in the last year of study. The state examination has the character of a colloquium.

Learning outcomes of the course:
After completing the course, the student will acquire the following knowledge, skills and competences:
Basic knowledge of mathematical analysis, algebra, geometry, school stochastics.

Course contents:
Updated theses for the colloquial examination are published on the faculty's website no later than the beginning of the summer semester in a given academic year.

Recommended or required literature:
According to the literature of compulsory courses of the given study programme.

Language of instruction:
Slovak

Notes:

Course evaluation:
Assessed students in total: 21

A	B	C	D	E	FX
23.81	38.1	14.29	14.29	9.52	0.0

Name of lecturer(s):

Last modification: 23.05.2025

Supervisor(s):
Person responsible for the delivery, development and quality of the study programme:
doc. Mgr. Eva Litavcová, PhD.

COURSE INFORMATION SHEET

University: Catholic University in Ružomberok	
Faculty: Faculty of Education	
Course code: KMAT/Ma-BD102A/25	**Course title:** Seminar in mathematics B1
Type and range of planned learning activities and teaching methods: **Form of instruction:** Seminar **Recommended study range:** **hours weekly:** 2 **hours per semester:** 26 **Teaching method:** on-site	
Credits: 2	**Working load:** 50 hours
Recommended semester/trimester: 1.	
Level of study: I.	
Prerequisities:	
Requirements for passing the course: Total student load: 50 hours. 24 hours - critical reading/study of the text, preparation of presentations, essay writing. Contact hours: 26 hours. The quality of the student's semester-long written polemical essay, his/her discussion activity, and the level and content of his/her presentations will determine the final grade for the course. Course grade: A - 100 % - 93 %, B - 92 % - 85 %, C - 84 % - 77 %, D - 76 % - 69 %, E - 68 % - 60 %, Fx - 59 % - 0 %.	
Learning outcomes of the course: Course Goal: The intent of the course is for students in various years of mathematics education to come together and learn to think critically, discuss, present, study a selected piece of mathematics or an appropriately chosen text, present their undergraduate/diploma work, while creating a space for guest lectures, philosophy/history/new trends in mathematics, and community building. Learning Outcomes: Appropriately for the first semester of the BSc, students will learn to think critically, discuss, study a selected piece of mathematics or an appropriately chosen text and present its/their content, as well as form an academic community at the same time. With reference to the matrix of objectives and learning outcomes, on completion of the course the student will have the following knowledge, skills and competences: V3 Have a rough overview of the methodology and epistemology of their subject specialisation. V4 Has a basic understanding of mathematical analysis, algebra, geometry, school stochastics and didactics of mathematics as foundations of the profession of mathematics teacher. Z2 Is able to think and argue critically. Z3 Is able to estimate the strengths and weaknesses of things, to carry out mental experiments. Z4 Is able to present in a sophisticated manner. K3 Is able to search for new professional information and process it independently. K4 Does not trust cheap and quick solutions to difficult problems.	

K5 Is interested in social events, willing to work on himself/herself, enjoys problem solving, views phenomena of various kinds (natural, social, economic) with a reasonable distance.

Course contents:
The basic skeleton of the implementation of the course will be a series of meetings, the content of which will be critical discussions and reflections on agreed topics related to mathematics and its teaching, sometimes raised by the guest during his lecture, critical readings of selected texts and their presentation, presentations of the results of bachelor's and master's theses.

Recommended or required literature:
The selection of appropriate study literature will be made at the beginning of each semester, also taking into account student preferences.

Language of instruction:
Slovak

Notes:

Course evaluation:
Assessed students in total: 30

A	B	C	D	E	FX
33.33	33.33	6.67	6.67	6.67	13.33

Name of lecturer(s): doc. PaedDr. Martin Papčo, PhD.

Last modification: 25.06.2025

Supervisor(s):
Person responsible for the delivery, development and quality of the study programme:
doc. Mgr. Eva Litavcová, PhD.

COURSE INFORMATION SHEET

University: Catholic University in Ružomberok	
Faculty: Faculty of Education	
Course code: KMAT/Ma-BD105A/25	**Course title:** Seminar in mathematics B2
Type and range of planned learning activities and teaching methods: **Form of instruction:** Seminar **Recommended study range:** **hours weekly:** 2 **hours per semester:** 26 **Teaching method:** on-site	
Credits: 2	**Working load:** 50 hours
Recommended semester/trimester: 2.	
Level of study: I.	
Prerequisities:	
Requirements for passing the course: Total student load: 50 hours. 24 hours - critical reading/study of the text, preparation of presentations, essay writing. Contact hours: 26 hours. The quality of the student's semester-long written polemical essay, his/her discussion activity, and the level and content of his/her presentations will determine the final grade for the course. Course grade: A - 100 % - 93 %, B - 92 % - 85 %, C - 84 % - 77 %, D - 76 % - 69 %, E - 68 % - 60 %, Fx - 59 % - 0 %.	
Learning outcomes of the course: Course Goal: The intent of the course is for students in various years of mathematics education to come together and learn to think critically, discuss, present, study a selected piece of mathematics or an appropriately chosen text, present their undergraduate/diploma work, while creating a space for guest lectures, philosophy/history/new trends in mathematics, and community building. Learning Outcomes: Appropriately for the second semester of the BSc, students will learn to think critically, discuss, study a selected piece of mathematics or an appropriately chosen text and present its/their content, as well as form an academic community at the same time. With reference to the matrix of objectives and learning outcomes, on completion of the course the student will have the following knowledge, skills and competences: V3 Have a rough overview of the methodology and epistemology of their subject specialisation. V4 Has a basic understanding of mathematical analysis, algebra, geometry, school stochastics and didactics of mathematics as foundations of the profession of mathematics teacher. Z2 Is able to think and argue critically. Z3 Is able to estimate the strengths and weaknesses of things, to carry out mental experiments. Z4 Is able to present in a sophisticated manner. K3 Is able to search for new professional information and process it independently. K4 Does not trust cheap and quick solutions to difficult problems.	

K5 Is interested in social events, willing to work on himself/herself, enjoys problem solving, views phenomena of various kinds (natural, social, economic) with a reasonable distance.

Course contents:
The basic skeleton of the implementation of the course will be a series of meetings, the content of which will be critical discussions and reflections on agreed topics related to mathematics and its teaching, sometimes raised by the guest during his lecture, critical readings of selected texts and their presentation, presentations of the results of bachelor's and master's theses.

Recommended or required literature:
The selection of appropriate study literature will be made at the beginning of each semester, also taking into account student preferences.

Language of instruction:
Slovak

Notes:

Course evaluation:
Assessed students in total: 31

A	B	C	D	E	FX
29.03	16.13	16.13	12.9	0.0	25.81

Name of lecturer(s): doc. PaedDr. Martin Papčo, PhD.

Last modification: 25.06.2025

Supervisor(s):
Person responsible for the delivery, development and quality of the study programme:
doc. Mgr. Eva Litavcová, PhD.

COURSE INFORMATION SHEET

University: Catholic University in Ružomberok	
Faculty: Faculty of Education	
Course code: KMAT/Ma-BD108A/25	**Course title:** Seminar in mathematics B3
Type and range of planned learning activities and teaching methods: **Form of instruction:** Seminar **Recommended study range:** **hours weekly:** 2 **hours per semester:** 26 **Teaching method:** on-site	
Credits: 2	**Working load:** 50 hours
Recommended semester/trimester: 3.	
Level of study: I.	
Prerequisities:	
Requirements for passing the course: Total student load: 50 hours. 24 hours - critical reading/study of the text, preparation of presentations, essay writing. Contact hours: 26 hours. The quality of the student's semester-long written polemical essay, his/her discussion activity, and the level and content of his/her presentations will determine the final grade for the course. Course grade: A – 100 % – 93 %, B – 92 % – 85 %, C – 84 % – 77 %, D – 76 % – 69 %, E – 68 % – 60 %, Fx – 59 % – 0 %.	
Learning outcomes of the course: Course Goal: The intent of the course is for students in various years of mathematics education to come together and learn to think critically, discuss, present, study a selected piece of mathematics or an appropriately chosen text, present their undergraduate/diploma work, while creating a space for guest lectures, philosophy/history/new trends in mathematics, and community building. Learning Outcomes: Appropriately for the third semester of the BSc, students will learn to think critically, discuss, study a selected piece of mathematics or an appropriately chosen text and present its/their content, as well as form an academic community at the same time. With reference to the matrix of objectives and learning outcomes, on completion of the course the student will have the following knowledge, skills and competences: V3 Have a rough overview of the methodology and epistemology of their subject specialisation. V4 Has a basic understanding of mathematical analysis, algebra, geometry, school stochastics and didactics of mathematics as foundations of the profession of mathematics teacher. Z2 Is able to think and argue critically. Z3 Is able to estimate the strengths and weaknesses of things, to carry out mental experiments. Z4 Is able to present in a sophisticated manner. K3 Is able to search for new professional information and process it independently. K4 Does not trust cheap and quick solutions to difficult problems.	

K5 Is interested in social events, willing to work on himself/herself, enjoys problem solving, views phenomena of various kinds (natural, social, economic) with a reasonable distance.

Course contents:
The basic skeleton of the implementation of the course will be a series of meetings, the content of which will be critical discussions and reflections on agreed topics related to mathematics and its teaching, sometimes raised by the guest during his lecture, critical readings of selected texts and their presentation, presentations of the results of bachelor's and master's theses.

Recommended or required literature:
The selection of appropriate study literature will be made at the beginning of each semester, also taking into account student preferences.

Language of instruction:
Slovak

Notes:

Course evaluation:
Assessed students in total: 18

A	B	C	D	E	FX
44.44	11.11	11.11	11.11	16.67	5.56

Name of lecturer(s): doc. PaedDr. Martin Papčo, PhD.

Last modification: 25.06.2025

Supervisor(s):
Person responsible for the delivery, development and quality of the study programme:
doc. Mgr. Eva Litavcová, PhD.

COURSE INFORMATION SHEET

University: Catholic University in Ružomberok	
Faculty: Faculty of Education	
Course code: KMAT/Ma-BD111A/25	**Course title:** Seminar in mathematics B4
Type and range of planned learning activities and teaching methods: **Form of instruction:** Seminar **Recommended study range:** **hours weekly:** 2 **hours per semester:** 26 **Teaching method:** on-site	
Credits: 2	**Working load:** 50 hours
Recommended semester/trimester: 4.	
Level of study: I.	
Prerequisities:	
Requirements for passing the course: Total student load: 50 hours. 24 hours - critical reading/study of the text, preparation of presentations, essay writing. Contact hours: 26 hours. The quality of the student's semester-long written polemical essay, his/her discussion activity, and the level and content of his/her presentations will determine the final grade for the course. Course grade: A – 100 % – 93 %, B – 92 % – 85 %, C – 84 % – 77 %, D – 76 % – 69 %, E – 68 % – 60 %, Fx – 59 % – 0 %.	
Learning outcomes of the course: Course Goal: The intent of the course is for students in various years of mathematics education to come together and learn to think critically, discuss, present, study a selected piece of mathematics or an appropriately chosen text, present their undergraduate/diploma work, while creating a space for guest lectures, philosophy/history/new trends in mathematics, and community building. Learning Outcomes: Appropriately for the fourth semester of the BSc, students will learn to think critically, discuss, study a selected piece of mathematics or an appropriately chosen text and present its/their content, as well as form an academic community at the same time. With reference to the matrix of objectives and learning outcomes, on completion of the course the student will have the following knowledge, skills and competences: V3 Have a rough overview of the methodology and epistemology of their subject specialisation. V4 Has a basic understanding of mathematical analysis, algebra, geometry, school stochastics and didactics of mathematics as foundations of the profession of mathematics teacher. Z2 Is able to think and argue critically. Z3 Is able to estimate the strengths and weaknesses of things, to carry out mental experiments. Z4 Is able to present in a sophisticated manner. K3 Is able to search for new professional information and process it independently. K4 Does not trust cheap and quick solutions to difficult problems.	

K5 Is interested in social events, willing to work on himself/herself, enjoys problem solving, views phenomena of various kinds (natural, social, economic) with a reasonable distance.

Course contents:
The basic skeleton of the implementation of the course will consist of a series of meetings, the content of which will be critical discussions and reflections on agreed topics related to mathematics and its teaching, sometimes raised by the guest during his lecture, critical readings of selected texts and their presentation, presentations of the results of bachelor's and master's theses.

Recommended or required literature:
The selection of appropriate study literature will be made at the beginning of each semester, also taking into account student preferences.

Language of instruction:
Slovak

Notes:

Course evaluation:
Assessed students in total: 19

A	B	C	D	E	FX
36.84	10.53	21.05	10.53	5.26	15.79

Name of lecturer(s): doc. PaedDr. Martin Papčo, PhD.

Last modification: 25.06.2025

Supervisor(s):
Person responsible for the delivery, development and quality of the study programme:
doc. Mgr. Eva Litavcová, PhD.

COURSE INFORMATION SHEET

University: Catholic University in Ružomberok	
Faculty: Faculty of Education	
Course code: KMAT/Ma-BD114A/25	**Course title:** Seminar in mathematics B5
Type and range of planned learning activities and teaching methods: **Form of instruction:** Seminar **Recommended study range:** **hours weekly:** 2 **hours per semester:** 26 **Teaching method:** on-site	
Credits: 2	**Working load:** 50 hours
Recommended semester/trimester: 5.	
Level of study: I.	
Prerequisities:	
Requirements for passing the course: Total student load: 50 hours. 24 hours - critical reading/study of the text, preparation of presentations, essay writing. Contact hours: 26 hours. The quality of the student's semester-long written polemical essay, his/her discussion activity, and the level and content of his/her presentations will determine the final grade for the course. Course grade: A – 100 % – 93 %, B – 92 % – 85 %, C – 84 % – 77 %, D – 76 % – 69 %, E – 68 % – 60 %, Fx – 59 % – 0 %.	
Learning outcomes of the course: Course Goal: The intent of the course is for students in various years of mathematics education to come together and learn to think critically, discuss, present, study a selected piece of mathematics or an appropriately chosen text, present their undergraduate/diploma work, while creating a space for guest lectures, philosophy/history/new trends in mathematics, and community building. Learning Outcomes: Appropriately for the fifth semester of the BSc, students will learn to think critically, discuss, study a selected piece of mathematics or an appropriately chosen text and present its/their content, as well as form an academic community at the same time. With reference to the matrix of objectives and learning outcomes, on completion of the course the student will have the following knowledge, skills and competences: V3 Have a rough overview of the methodology and epistemology of their subject specialisation. V4 Has a basic understanding of mathematical analysis, algebra, geometry, school stochastics and didactics of mathematics as foundations of the profession of mathematics teacher. Z2 Is able to think and argue critically. Z3 Is able to estimate the strengths and weaknesses of things, to carry out mental experiments. Z4 Is able to present in a sophisticated manner. K3 Is able to search for new professional information and process it independently. K4 Does not trust cheap and quick solutions to difficult problems.	

K5 Is interested in social events, willing to work on himself/herself, enjoys problem solving, views phenomena of various kinds (natural, social, economic) with a reasonable distance.

Course contents:
The basic skeleton of the implementation of the course will consist of a series of meetings, the content of which will be critical discussions and reflections on agreed topics related to mathematics and its teaching, sometimes raised by the guest during his lecture, critical readings of selected texts and their presentation, presentations of the results of bachelor's and master's theses.

Recommended or required literature:
The selection of appropriate study literature will be made at the beginning of each semester, also taking into account student preferences.

Language of instruction:
Slovak

Notes:

Course evaluation:
Assessed students in total: 14

A	B	C	D	E	FX
42.86	21.43	14.29	0.0	14.29	7.14

Name of lecturer(s): doc. PaedDr. Martin Papčo, PhD.

Last modification: 25.06.2025

Supervisor(s):
Person responsible for the delivery, development and quality of the study programme:
doc. Mgr. Eva Litavcová, PhD.

COURSE INFORMATION SHEET

University: Catholic University in Ružomberok	
Faculty: Faculty of Education	
Course code: KMAT/Ma-BD116A/25	**Course title:** Seminar in mathematics B6
Type and range of planned learning activities and teaching methods: **Form of instruction:** Seminar **Recommended study range:** **hours weekly:** 1 **hours per semester:** 13 **Teaching method:** on-site	
Credits: 1	**Working load:** 25 hours
Recommended semester/trimester: 6.	
Level of study: I.	
Prerequisities:	
Requirements for passing the course: Total student load: 25 hours. 12 hours - critical reading/study of the text, preparation of presentations, essay writing. Contact hours: 13 hours. The quality of the student's semester-long written polemical essay, his/her discussion activity, and the level and content of his/her presentations will determine the final grade for the course. Course grade: A – 100 % – 93 %, B – 92 % – 85 %, C – 84 % – 77 %, D – 76 % – 69 %, E – 68 % – 60 %, Fx – 59 % – 0 %.	
Learning outcomes of the course: Course Goal: The intent of the course is for students in various years of mathematics education to come together and learn to think critically, discuss, present, study a selected piece of mathematics or an appropriately chosen text, present their undergraduate/diploma work, while creating a space for guest lectures, philosophy/history/new trends in mathematics, and community building. Learning Outcomes: Appropriately for the first semester of the BSc, students will learn to think critically, discuss, study a selected piece of mathematics or an appropriately chosen text and present its/their content, as well as form an academic community at the same time. With reference to the matrix of objectives and learning outcomes, on completion of the course the student will have the following knowledge, skills and competences: V3 Have a rough overview of the methodology and epistemology of their subject specialisation. V4 Has a basic understanding of mathematical analysis, algebra, geometry, school stochastics and didactics of mathematics as foundations of the profession of mathematics teacher. Z2 Is able to think and argue critically. Z3 Is able to estimate the strengths and weaknesses of things, to carry out mental experiments. Z4 Is able to present in a sophisticated manner. K3 Is able to search for new professional information and process it independently. K4 Does not trust cheap and quick solutions to difficult problems.	

K5 Is interested in social events, willing to work on himself/herself, enjoys problem solving, views phenomena of various kinds (natural, social, economic) with a reasonable distance.

Course contents:
The basic skeleton of the implementation of the course will consist of a series of meetings, the content of which will be critical discussions and reflections on agreed topics related to mathematics and its teaching, sometimes raised by the guest during his lecture, critical readings of selected texts and their presentation, presentations of the results of bachelor's and master's theses.

Recommended or required literature:
The selection of appropriate study literature will be made at the beginning of each semester, also taking into account student preferences.

Language of instruction:
Slovak

Notes:

Course evaluation:
Assessed students in total: 13

A	B	C	D	E	FX
61.54	7.69	15.38	7.69	0.0	7.69

Name of lecturer(s): doc. PaedDr. Martin Papčo, PhD.

Last modification: 25.06.2025

Supervisor(s):
Person responsible for the delivery, development and quality of the study programme:
doc. Mgr. Eva Litavcová, PhD.

COURSE INFORMATION SHEET

University: Catholic University in Ružomberok	
Faculty: Faculty of Education	
Course code: KMAT/Ma-BD103B/25	**Course title:** Sets of numbers with operations
Type and range of planned learning activities and teaching methods: **Form of instruction:** Lecture / Seminar **Recommended study range:** **hours weekly:** 1 / 1 **hours per semester:** 13 / 13 **Teaching method:** on-site	
Credits: 3	**Working load:** 75 hours
Recommended semester/trimester: 5.	
Level of study: I.	
Prerequisities:	
Requirements for passing the course: Total student load: 75 hours. Contact hours 26 hours, continuous weekly problem solving 26 hours, exam preparation 9 hours, exam preparation 14 hours. During the semester, students will be given weekly homework assignments and will write short written flashcards from these assignments; the condition for participation in the exam is to score at least half of the total points for the flashcards. The exam consists of both written and oral parts. Course grade: A - 100 % - 93 %, B - 92 % - 85 %, C - 84 % - 77 %, D - 76 % - 69 %, E - 68 % - 60 %, Fx - 59 % - 0 %.	
Learning outcomes of the course: Course Goal: The goal of this course is to familiarize students with the construction and properties of number fields, with particular attention to a deeper understanding of the conceptual framework and algorithms applied in school mathematics. Learning outcomes: Upon completion of the course, the student will acquire the following knowledge, skills and competences: An overview of the construction and basic properties of the domains of natural, integer, rational, real and complex numbers, an understanding of their interrelations and differences, an understanding of number notation in the positional p-adic system.	
Course contents: The semiring of natural numbers. The ring of integers. The field of rational numbers. The field of real numbers. Number systems. Expression of a real number by infinite decimal expansion. Approximate expression of a real number. The field of complex numbers.	

Recommended or required literature:

Znám Š.: Teória čísel, SPN Bratislava 1966.
Kučera R., Skula L.: Číselné obory. Masarykova univerzita, Brno 1998.
Hruša K. a kol.: Aritmetika a algebra pro pedagogické fakulty. I. DÍL ARITMETIKA. SPN, Praha 1964.
Hruša K. a kol.: ARITMETIKA pre pedagogické inštitúty. SPN, Bratislava 1961.
Harminc M.: Elementárna teória čísel. UPJŠ, Košice 2003.
Tirpáková A., Markechová D.: Základy elementárnej aritmetiky. Univerzita Konštantína Filozofa v Nitre, Nitra 2011.
Hanzel P., Klenovčan P.: ČÍSLA A POČÍTANIE. UMB, Banská Bystrica 2013.

Language of instruction:
Slovak

Notes:

Course evaluation:
Assessed students in total: 0

A	B	C	D	E	FX
0.0	0.0	0.0	0.0	0.0	0.0

Name of lecturer(s): doc. PaedDr. Martin Papčo, PhD., RNDr. Lucia Csachová, PhD.

Last modification: 25.06.2025

Supervisor(s):
Person responsible for the delivery, development and quality of the study programme:
doc. Mgr. Eva Litavcová, PhD.

COURSE INFORMATION SHEET

University: Catholic University in Ružomberok	
Faculty: Faculty of Education	
Course code: KMAT/Ma-BD113A/22	**Course title:** Stochastics for teachers
Type and range of planned learning activities and teaching methods: **Form of instruction:** Lecture / Seminar **Recommended study range:** **hours weekly:** 2 / 1 **hours per semester:** 26 / 13 **Teaching method:** on-site	
Credits: 2	**Working load:** 50 hours
Recommended semester/trimester: 5.	
Level of study: I.	
Prerequisities:	
Requirements for passing the course: Total student load: 75 hours. 39 contact hours. 11 hours - continuous weekly problem solving 3 hours, preparation for written exams 3 hours, preparation for oral exam 5 hours. During the semester, students will be given weekly homework assignments and will write short papers - flashcards; the condition for participation in the exam is to score at least half of the total points for the flashcards. The exam consists of both written and oral parts.	
Learning outcomes of the course: Students will gain a solid understanding of basic concepts and connections in combinatorics and discrete probability, with particular reference to their application in school mathematics. With reference to the matrix of learning objectives and learning outcomes, on completion of the course the student will acquire the following knowledge, skills and competences: V4 Have a basic knowledge of mathematical analysis, algebra, geometry, school stochastics and didactics of mathematics as the foundations of the profession of mathematics teacher. Z2 Is able to think and argue critically. K4 Does not trust cheap and quick solutions to difficult problems. K5 Is interested in the events in society, willing to work on oneself, enjoys solving problems, looks at phenomena of various kinds (natural, social, economic) with a reasonable distance.	
Course contents: Basic combinatorial functions. Basic combinatorial concepts. Finite set decompositions. Principle of inclusion and excision. Decompositions of natural numbers into addends. Partitioning into partitions. Block diagrams, Latin squares. Random experiment and its stochastic model, urn schemes. Event and its probability. Properties of probability. Axiomatics of probability theory. Conditional probability. Stochastic independence of events.	

Random variable and its distribution. Probability space generated by a random variable. Random vector and its distribution.
Numerical characteristics of a random variable.

Recommended or required literature:

1. Fuchs, E.: Discrete Mathematics, Masaryk University, Brno 2001.
2. Płocki, A.: Probability around us, Ružomberok 2004, 2008
3. Zvára, K., Štěpán. J.: Probability and Mathematical Statistics, MATFYZPRESS, Prague 2001

Language of instruction:
Slovak

Notes:

Course evaluation:
Assessed students in total: 16

A	B	C	D	E	FX
25.0	12.5	6.25	18.75	6.25	31.25

Name of lecturer(s): doc. PaedDr. Martin Papčo, PhD.

Last modification: 25.06.2025

Supervisor(s):
Person responsible for the delivery, development and quality of the study programme:
doc. Mgr. Eva Litavcová, PhD.

COURSE INFORMATION SHEET

University: Catholic University in Ružomberok	
Faculty: Faculty of Education	
Course code: KMAT/Ma-BD117A/25	**Course title:** Teaching practice in mathematics
Type and range of planned learning activities and teaching methods: **Form of instruction:** Seminar **Recommended study range:** **hours weekly:** 1 **hours per semester:** 13 **Teaching method:** on-site	
Credits: 2	**Working load:** 50 hours
Recommended semester/trimester: 5.	
Level of study: I.	
Prerequisities:	

Requirements for passing the course:

During the semester, the student will attend 10 listening sessions of mathematics lessons taught by a trainee teacher at a primary or secondary school. During this time, he/she keeps a pedagogical diary. In the diary, he/she records notes from mathematics on the topics taught and the didactic and pedagogical procedures of the trainee teacher. He/she carries out analyses of the lessons he/she attended with the trainee teacher (the implementation takes place in groups). The trainee teacher will give the student an assessment that represents 60% of the assessment. The student's work discipline and behavior, cooperation with the trainee teacher, educational impact, language expression, interest in learning about the school environment and relationship to the teaching profession are assessed. The student will prepare a protocol for each lesson, where he/she evaluates the activities of the teacher and pupils. These documents, as well as the preparation of pedagogical diaries and analyses of lessons with the trainee teacher, serve the practice methodologist for the final assessment of the student to the extent of 40%.

Course evaluation:

A - 100% - 93%
B - 92% - 85%
C - 84% - 77%
D - 76% - 69%
E - 68% - 60%
Fx - 59% - 0%

Learning outcomes of the course:

The aim of the course is to observe methodological approaches, specific characteristics of mathematics teaching and basic stages of the teaching process. Furthermore, it is the observation of the work of the mathematics teacher and his creative component throughout the entire lesson. The observation of the specific structure of the lesson according to the following model is also important: emotional and cognitive sensitization, value reflection, classroom training through experiential learning, real experience and connection with life.

After completing the subject, the student will acquire the following knowledge, skills and competencies:

- The student is able to observe, analyze and write in observation records and pedagogical diaries pedagogical and psychological aspects of the educational process.

- The student is able to observe the teacher's work in the lesson, work and curriculum, selection of methods and means and also the level of management of the learning and cognitive activity of students.
- The student is able to analyze the lessons in cooperation with the training teacher and independently develop a pedagogical diary.
With reference to the matrix of educational goals and outcomes, after completing the course, the student will acquire the following knowledge, skills and competencies:
V1 The student masters the pedagogical-psychological foundations of upbringing and education.
V2 The student partially knows the principles of pedagogical diagnostics, also with regard to the individual characteristics of pupils and students.
Z2 The student is able to think critically and argue.
Z4 The student can present in a refined manner.
K1 The student is responsible for the safety and health of pupils.
K2 The student is able to respond promptly and appropriately quickly to the study results of pupils.

Course contents:
1. Familiarization with the necessary documentation required for entry into the training school and the conditions for completing the internship.
2. Hospitation at 10 lessons and their analysis. (Observation of the educational process, conditions in the school environment, pedagogical documentation.)
3. Preparation of protocols from the lessons.
4. Submission of a pedagogical diary prepared according to the requirements of the training teacher and the methodology of the internship.

Recommended or required literature:
Kramáreková, H. a kol. 2012. Pedagogická prax v príprave učiteľov, 1. vyd. Nitra: Univerzita Konštantína Filozofa, Pedagogická fakulta. ISBN 978-80-558-0160-5.
Petlák, E. 2007. Pedagogicko-didaktická práca učiteľa. Bratislava: IRIS. ISBN 808901805X.
Čapek, R. 2017. Moderní didaktika. České Budějovice: Grada. ISBN 9788024734507.
Učebnice matematiky pre základné a stredné školy.

Language of instruction:
Slovak language

Notes:

Course evaluation:
Assessed students in total: 15

A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0

Name of lecturer(s): RNDr. Lucia Csachová, PhD.

Last modification: 19.06.2025

Supervisor(s):
Person responsible for the delivery, development and quality of the study programme:
doc. Mgr. Eva Litavcová, PhD.