

## Course descriptions

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## COURSE DESCRIPTION

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                     |
| <b>Course ID:</b><br>FMFI.KAG/1-MAT-220/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Course title:</b><br>Algebra (1) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 1 <b>per level/semester:</b> 26 / 13<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                       |                                     |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                     |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                     |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                     |
| <b>Prerequisites:</b> FMFI.KAG/1-MAT-120/15 - Linear Algebra and Geometry (1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                     |
| <b>Recommended prerequisites:</b><br>1-MAT-160 Linar algebra and geometry (2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                     |
| <b>Course requirements:</b><br>Ongoing evaluation: homeworks and test<br>Exam: combined<br>Indicative evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 30/70                                                                                                                                                                                                                                                                                                                                    |                                     |
| <b>Learning outcomes:</b><br>Mastering the basic concepts and methods in the area of group theory, and the ability to actively use them to solve theoretical problems.                                                                                                                                                                                                                                                                                                                                                                         |                                     |
| <b>Class syllabus:</b><br>Semigroups and monoids. Definition and examples of groups. Subgroups and subgroups generated by a set.<br>Cyclic groups. Invariant subgroups and factor groups. Homomorphisms and congruence relations of groups. Theorem of Lagrange. Permutations groups. Direct product of groups.<br>Rings, integral domains and fields (definitions and examples). Subrings and ideals. Ideals and differential rings.<br>Homomorphisms and congruence relations of rings. Field of fractions of a commutative integral domain. |                                     |
| <b>Recommended literature:</b><br>T. Katriňák a kol.: Algebra and theoretical arithmetics 1, Univerzita Komenského, 1999 (slovak)<br>G. Birkhoff, S. Mac Lane, Survey of modern algebra, Bratislava, Alfa 1979 (slovak transl.)                                                                                                                                                                                                                                                                                                                |                                     |
| <b>Languages necessary to complete the course:</b><br>slovak, english                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                     |

|                                                 |      |       |      |       |      |
|-------------------------------------------------|------|-------|------|-------|------|
| <b>Past grade distribution</b>                  |      |       |      |       |      |
| Total number of evaluated students: 304         |      |       |      |       |      |
| A                                               | B    | C     | D    | E     | FX   |
| 14,8                                            | 5,26 | 12,17 | 12,5 | 46,38 | 8,88 |
| <b>Lecturers:</b> doc. RNDr. Martin Mačaj, PhD. |      |       |      |       |      |
| <b>Last change:</b> 14.03.2022                  |      |       |      |       |      |
| <b>Approved by:</b>                             |      |       |      |       |      |

## COURSE DESCRIPTION

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------------------------------|-------|-------|------|
| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                   |      |                                     |       |       |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                 |      |                                     |       |       |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                   |      |                                     |       |       |      |
| <b>Course ID:</b><br>FMFI.KAG/1-MAT-260/00                                                                                                                                                                                                                                                                                                        |      | <b>Course title:</b><br>Algebra (2) |       |       |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 1 <b>per level/semester:</b> 26 / 13<br><b>Form of the course:</b> on-site learning                                                                                                                          |      |                                     |       |       |      |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                                                                                       |      |                                     |       |       |      |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                                                                                   |      |                                     |       |       |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                      |      |                                     |       |       |      |
| <b>Prerequisites:</b> FMFI.KAG/1-MAT-220/00 - Algebra (1)                                                                                                                                                                                                                                                                                         |      |                                     |       |       |      |
| <b>Course requirements:</b><br>Ongoing evaluation: homeworks and test<br>Exam: combined<br>Indicative evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 30/70                                                                                                                                       |      |                                     |       |       |      |
| <b>Learning outcomes:</b><br>Mastering the basic concepts and methods in the area of group theory, and the ability to actively use them to solve theoretical problems.                                                                                                                                                                            |      |                                     |       |       |      |
| <b>Class syllabus:</b><br>Polynomial rings. Ring of functions. Polynomials in several elements. Structure of polynomial rings: greatest common divisors, factorization theory. Roots of a polynomial in a field, factorization of a polynomial using roots. Simple algebraic extension of a field. Solutions of some special algebraic equations. |      |                                     |       |       |      |
| <b>Recommended literature:</b><br>T. Katriňák a kol.:Algebra and theoretical arithmetics 1, Univerzita Komenského, 1999 (Slovak)<br>G. Birkhoff, S. Mac Lane: Survey of modern algebra, Bratislava, Alfa 1979 (Slovak transl.)                                                                                                                    |      |                                     |       |       |      |
| <b>Languages necessary to complete the course:</b><br>slovak,english                                                                                                                                                                                                                                                                              |      |                                     |       |       |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                     |      |                                     |       |       |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 271                                                                                                                                                                                                                                                                         |      |                                     |       |       |      |
| A                                                                                                                                                                                                                                                                                                                                                 | B    | C                                   | D     | E     | FX   |
| 18,08                                                                                                                                                                                                                                                                                                                                             | 5,17 | 10,7                                | 21,03 | 38,38 | 6,64 |
| <b>Lecturers:</b> doc. RNDr. Martin Mačaj, PhD.                                                                                                                                                                                                                                                                                                   |      |                                     |       |       |      |
| <b>Last change:</b> 14.03.2022                                                                                                                                                                                                                                                                                                                    |      |                                     |       |       |      |

**Approved by:**

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                             |       |     |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                             |       |     |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                               |       |                                             |       |     |      |
| <b>Course ID:</b><br>FMFI.KAG/1-MAT-735/11                                                                                                                                                                                                                                                                                                                                                                                                                    |       | <b>Course title:</b><br>Algebra Classes (1) |       |     |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 1 <b>per level/semester:</b> 13<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                         |       |                                             |       |     |      |
| <b>Number of credits:</b> 1                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                             |       |     |      |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                             |       |     |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                             |       |     |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                             |       |     |      |
| <b>Course requirements:</b><br>Ongoing evaluation: homeworks and test<br>Indicative evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                     |       |                                             |       |     |      |
| <b>Learning outcomes:</b><br>Students will acquire practical computational skills related to the topics from the lecture and compulsory practice in course Algebra (1).<br>During discussions on problems, they will improve in asking questions in the analysis of the problem, gradually building arguments, understand why and how the algorithmic procedures are taken to lead to the desired results, resp. they will learn to notice their limitations. |       |                                             |       |     |      |
| <b>Class syllabus:</b><br>Topics according to the individual interest of the participants, in the following framework: semigroups and monoids, abstract notion of groups, subgroups and subgroups generated by a set, cyclic groups, normal subgroups and their relation to congruences and homomorphisms, Lagrange's theorem, permutation groups, direct product of groups, factor groups , action group on a set.                                           |       |                                             |       |     |      |
| <b>Recommended literature:</b><br>T. Katriňák a kol.: Algebra and theoretical arithmetics 1, Univerzita Komenského, 1999 (slovak)<br>G. Birkhoff, S. Mac Lane, Survey of modern algebra, Bratislava, Alfa 1979 (slovak transl.)                                                                                                                                                                                                                               |       |                                             |       |     |      |
| <b>Languages necessary to complete the course:</b><br>slovak, english                                                                                                                                                                                                                                                                                                                                                                                         |       |                                             |       |     |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                             |       |     |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 153                                                                                                                                                                                                                                                                                                                                                                                     |       |                                             |       |     |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                             | B     | C                                           | D     | E   | FX   |
| 45,1                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 15,03 | 11,11                                       | 14,38 | 9,8 | 4,58 |
| <b>Lecturers:</b> doc. RNDr. Martin Mačaj, PhD.                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                             |       |     |      |

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|--------------------------------|
| <b>Last change:</b> 14.03.2022 |
| <b>Approved by:</b>            |

## COURSE DESCRIPTION

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                             |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |
| <b>Course ID:</b><br>FMFI.KAG/1-MAT-736/11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Course title:</b><br>Algebra Classes (2) |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 1 per level/semester: 13</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                             |
| <b>Number of credits:</b> 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                             |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                             |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                             |
| <b>Course requirements:</b><br>Ongoing evaluation: homeworks and test<br>Indicative evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                             |
| <b>Learning outcomes:</b><br>Students will acquire practical computational skills related to the topics from the lecture and compulsory practice in course Algebra (2).<br>During discussions on problems, they will improve in asking questions in the analysis of the problem, gradually building arguments, understand why and how the algorithmic procedures are taken to lead to the desired results, resp. they will learn to notice their limitations.                                                                                                                                                                                |                                             |
| <b>Class syllabus:</b><br>Topics according to the individual interest of the participants, in the following framework: definitions of rings, integral domains and fields, subrings and ideals, relations between ideals, homomorphisms and ring congruences, construction of the quotient field, factor ring, definition of a ring of polynomials of one indefinite, greatest common divisor of polynomials, decomposition into product of irreducible polynomials, Horner's scheme, Taylor polynomial, polynomial roots and polynomial decomposition into product of root factors, polynomials of several indefinite, symmetric polynomials |                                             |
| <b>Recommended literature:</b><br>T. Katriňák a kol.: Algebra and theoretical arithmetics 1, Univerzita Komenského, 1999 (slovak)<br>G. Birkhoff, S. Mac Lane, Survey of modern algebra, Bratislava, Alfa 1979 (slovak transl.)                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                             |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                             |

|                                                 |       |      |      |      |      |
|-------------------------------------------------|-------|------|------|------|------|
| <b>Past grade distribution</b>                  |       |      |      |      |      |
| Total number of evaluated students: 138         |       |      |      |      |      |
| A                                               | B     | C    | D    | E    | FX   |
| 58,7                                            | 21,01 | 7,25 | 5,07 | 6,52 | 1,45 |
| <b>Lecturers:</b> doc. RNDr. Martin Mačaj, PhD. |       |      |      |      |      |
| <b>Last change:</b> 14.03.2022                  |       |      |      |      |      |
| <b>Approved by:</b>                             |       |      |      |      |      |

## COURSE DESCRIPTION

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                |
| <b>Course ID:</b><br>FMFI.KI/2-INF-278/18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Course title:</b><br>Analytic and Enumerative Combinatorics |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture<br><b>Number of hours:</b><br><b>per week: 4 per level/semester: 52</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                |
| <b>Number of credits:</b> 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                |
| <b>Educational level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                |
| <b>Recommended prerequisites:</b><br>2-INF-277/18 Complex Analysis for Computer Scientists or 1-MAT-416/15 Theory of Complex Variable Functions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                |
| <b>Course requirements:</b><br>homework assignments, written and oral exam<br>Scale of assessment (preliminary/final): 40/60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                |
| <b>Learning outcomes:</b><br>Students will understand the key methods of analytic combinatorics and will be able to apply their theoretical knowledge on the fields of combinatorial enumeration and algorithm analysis. They will also get acquainted with selected techniques and results of classical enumerative combinatorics.                                                                                                                                                                                                                                                                                                                    |                                                                |
| <b>Class syllabus:</b><br>The algebra of formal power series. Unlabelled and labelled combinatorial structures, ordinary and exponential generating functions, the symbolic method and its connection to formal languages. Generating functions as analytical objects, their singularities, Pringsheim's theorem. Singularity analysis and its applications. Coefficients of rational, meromorphic, and algebraic functions. The saddle-point method and its applications. Multivariate analytic combinatorics. Selected topics in classical enumerative combinatorics: Cayley's formula, Möbius inversion over locally finite posets, Pólya's theory. |                                                                |
| <b>Recommended literature:</b><br>Electronic materials on the course website.<br>Analytic Combinatorics / Philippe Flajolet, Robert Sedgewick. Cambridge : Cambridge University Press, 2009<br>Notes on Counting: An Introduction to Enumerative Combinatorics / Peter J. Cameron. Cambridge : Cambridge University Press, 2017<br>Analytic Combinatorics: A Multidimensional Approach / Marni Mishna. Boca Raton : CRC Press, 2019<br>Algorithmic and Symbolic Combinatorics / Stephen Melczer. Cham : Springer, 2021                                                                                                                                 |                                                                |

Analytic Combinatorics in Several Variables / Robin Pemantle, Mark C. Wilson. New York : Cambridge University Press, 2013  
 Introductory Combinatorics, 5th ed. / Richard A. Brualdi. Upper Saddle River : Pearson, 2010  
 Kapitoly z diskrétní matematiky, 3rd ed. / Jiří Matoušek, Jaroslav Nešetřil. Prague : Karolinum, 2007  
 Algebraic Combinatorics, 2nd ed. / Richard P. Stanley. Cham : Springer, 2018  
 Discrete Calculus: Methods for Counting / Carlo Mariconda, Alberto Tonolo. Cham : Springer, 2016

**Languages necessary to complete the course:**

Slovak, English

**Notes:**

**Past grade distribution**

Total number of evaluated students: 2

| A     | B   | C   | D   | E   | FX  |
|-------|-----|-----|-----|-----|-----|
| 100,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 |

**Lecturers:** RNDr. Peter Kostolányi, PhD.

**Last change:** 14.03.2022

**Approved by:**

## STATE EXAM DESCRIPTION

|                                                                 |                                            |
|-----------------------------------------------------------------|--------------------------------------------|
| <b>Academic year:</b> 2021/2022                                 |                                            |
| <b>University:</b> Comenius University Bratislava               |                                            |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics |                                            |
| <b>Course ID:</b><br>FMFI.KMANM/1-<br>MAT-991/15                | <b>Course title:</b><br>BSc Thesis Defense |
| <b>Number of credits:</b> 8                                     |                                            |
| <b>Educational level:</b> I.                                    |                                            |
| <b>State exam syllabus:</b>                                     |                                            |
| <b>Last change:</b> 02.06.2015                                  |                                            |
| <b>Approved by:</b>                                             |                                            |

## COURSE DESCRIPTION

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------------------------------------------------------|-------|-------|------|
| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                                           |       |       |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                                           |       |       |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                                           |       |       |      |
| <b>Course ID:</b><br>FMFI.KAMŠ/1-PMA-510/00                                                                                                                                                                                                                                                                                                                                                                                                                                  |       | <b>Course title:</b><br>Basics of Mathematical Statistics |       |       |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture<br><b>Number of hours:</b><br><b>per week: 4 per level/semester: 52</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                  |       |                                                           |       |       |      |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                           |       |       |      |
| <b>Recommended semester:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                                           |       |       |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                                           |       |       |      |
| <b>Prerequisites:</b> FMFI.KAMŠ/1-MAT-282/00 - Probability and Statistics (2)                                                                                                                                                                                                                                                                                                                                                                                                |       |                                                           |       |       |      |
| <b>Course requirements:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                           |       |       |      |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                                           |       |       |      |
| <b>Class syllabus:</b><br>Parametric classes of distributions, random sample, statistics, basis of theory of point and interval estimation. Rao - Cramer inequality, methods of estimation of parameters. Basis of testing statistical hypothesis, Neyman - Pearson lemma, tests of one and two sided hypothesis. Tests on parameters of normal distribution.                                                                                                                |       |                                                           |       |       |      |
| <b>Recommended literature:</b><br>Anděl, J.: Matematická statistika. SNTL, Alfa, Praha, 1985.<br>Lamoš, F., Potocký R.: Pravdepodobnosť a matematická statistika, Štatistické analýzy, UK, Bratislava, 1998.<br>Potocký, R. a kol.: Zbierka úloh z pravdepodobnosti a matematickej štatistiky. Alfa, Bratislava 1986.<br>Rao, R.: Lineární metody statistické indukce a jejich aplikace. Praha, Academia 1978<br>Wilks, S.: Matematičeskaja statistika. Nauka, Moskva, 1967. |       |                                                           |       |       |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                                           |       |       |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                                           |       |       |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 280                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                                           |       |       |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | B     | C                                                         | D     | E     | FX   |
| 24,64                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 15,71 | 21,43                                                     | 20,36 | 14,29 | 3,57 |
| <b>Lecturers:</b> RNDr. Andrej Náther, PhD.                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                           |       |       |      |
| <b>Last change:</b> 02.06.2015                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                           |       |       |      |
| <b>Approved by:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                                           |       |       |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                        |       |                                            |     |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                      |       |                                            |     |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                        |       |                                            |     |      |      |
| <b>Course ID:</b><br>FMFI.KMANM/1-MAT-510/00                                                                                                                                                                                                                                                                                                                           |       | <b>Course title:</b><br>Biomathematics (1) |     |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                     |       |                                            |     |      |      |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                            |       |                                            |     |      |      |
| <b>Recommended semester:</b> 5.                                                                                                                                                                                                                                                                                                                                        |       |                                            |     |      |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                           |       |                                            |     |      |      |
| <b>Prerequisites:</b> FMFI.KMANM/1-MAT-250/14 - Mathematical Analysis (4) or FMFI.KMANM/1-MMN-250/17 - Mathematical Analysis (4) or FMFI.KMANM/1-BMF-261/15 - Basics of Mathematics (4)                                                                                                                                                                                |       |                                            |     |      |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 40/60                                                                                                                                                                                                                                                                                          |       |                                            |     |      |      |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                                                                                              |       |                                            |     |      |      |
| <b>Class syllabus:</b><br>Selection dynamics and population genetics: Hardy-Weinberger law for two and more alleles, the selection equation, the mutation selection equation, the selection recombination equation.<br>Models of population ecology: logistic equation, Lotka-Volterra equations for predator-prey systems with and without intraspecific competition. |       |                                            |     |      |      |
| <b>Recommended literature:</b><br>J. Hofbauer, K. Sigmund: The Theory of Evolution and Dynamical systems, Cambridge University Press, Cambridge 1988.                                                                                                                                                                                                                  |       |                                            |     |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                     |       |                                            |     |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                          |       |                                            |     |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 141                                                                                                                                                                                                                                                                                              |       |                                            |     |      |      |
| A                                                                                                                                                                                                                                                                                                                                                                      | B     | C                                          | D   | E    | FX   |
| 51,77                                                                                                                                                                                                                                                                                                                                                                  | 17,73 | 18,44                                      | 7,8 | 3,55 | 0,71 |
| <b>Lecturers:</b> prof. RNDr. Jaroslav Jaroš, CSc.                                                                                                                                                                                                                                                                                                                     |       |                                            |     |      |      |
| <b>Last change:</b> 02.06.2015                                                                                                                                                                                                                                                                                                                                         |       |                                            |     |      |      |
| <b>Approved by:</b>                                                                                                                                                                                                                                                                                                                                                    |       |                                            |     |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                |       |                                            |       |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                              |       |                                            |       |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                |       |                                            |       |      |      |
| <b>Course ID:</b><br>FMFI.KMANM/1-MAT-515/00                                                                                                                                                                                                                   |       | <b>Course title:</b><br>Biomathematics (2) |       |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                             |       |                                            |       |      |      |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                    |       |                                            |       |      |      |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                                                |       |                                            |       |      |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                   |       |                                            |       |      |      |
| <b>Prerequisites:</b> FMFI.KMANM/1-MAT-510/00 - Biomathematics (1)                                                                                                                                                                                             |       |                                            |       |      |      |
| <b>Course requirements:</b>                                                                                                                                                                                                                                    |       |                                            |       |      |      |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                      |       |                                            |       |      |      |
| <b>Class syllabus:</b><br>Models of population ecology: the equilibria and their stability, Lotka-Volterra equations for more than two populations.<br>Game dynamics: evolutionary stable strategies, evolution of phenotypes, equations for asymmetric games. |       |                                            |       |      |      |
| <b>Recommended literature:</b><br>J. Hofbauer, K. Sigmund: The Theory of Evolution and Dynamical systems, Cambridge University Press, Cambridge 1988.                                                                                                          |       |                                            |       |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                             |       |                                            |       |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                  |       |                                            |       |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 63                                                                                                                                                                                       |       |                                            |       |      |      |
| A                                                                                                                                                                                                                                                              | B     | C                                          | D     | E    | FX   |
| 42,86                                                                                                                                                                                                                                                          | 15,87 | 23,81                                      | 14,29 | 1,59 | 1,59 |
| <b>Lecturers:</b> prof. RNDr. Jaroslav Jaroš, CSc.                                                                                                                                                                                                             |       |                                            |       |      |      |
| <b>Last change:</b> 02.06.2015                                                                                                                                                                                                                                 |       |                                            |       |      |      |
| <b>Approved by:</b>                                                                                                                                                                                                                                            |       |                                            |       |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                   |       |                                        |      |     |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                 |       |                                        |      |     |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                   |       |                                        |      |     |      |
| <b>Course ID:</b><br>FMFI.KAI/1-AIN-407/15                                                                                                                                                        |       | <b>Course title:</b><br>Brain and Mind |      |     |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> course<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning |       |                                        |      |     |      |
| <b>Number of credits:</b> 3                                                                                                                                                                       |       |                                        |      |     |      |
| <b>Recommended semester:</b> 1., 3., 5.                                                                                                                                                           |       |                                        |      |     |      |
| <b>Educational level:</b> I.                                                                                                                                                                      |       |                                        |      |     |      |
| <b>Prerequisites:</b>                                                                                                                                                                             |       |                                        |      |     |      |
| <b>Course requirements:</b>                                                                                                                                                                       |       |                                        |      |     |      |
| <b>Learning outcomes:</b>                                                                                                                                                                         |       |                                        |      |     |      |
| <b>Class syllabus:</b>                                                                                                                                                                            |       |                                        |      |     |      |
| <b>Recommended literature:</b>                                                                                                                                                                    |       |                                        |      |     |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                |       |                                        |      |     |      |
| <b>Notes:</b>                                                                                                                                                                                     |       |                                        |      |     |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 154                                                                                                                         |       |                                        |      |     |      |
| A                                                                                                                                                                                                 | B     | C                                      | D    | E   | FX   |
| 48,05                                                                                                                                                                                             | 18,83 | 15,58                                  | 8,44 | 2,6 | 6,49 |
| <b>Lecturers:</b> RNDr. Barbora Cimrová, PhD., doc. PhDr. Ján Rybár, PhD.                                                                                                                         |       |                                        |      |     |      |
| <b>Last change:</b> 21.03.2022                                                                                                                                                                    |       |                                        |      |     |      |
| <b>Approved by:</b>                                                                                                                                                                               |       |                                        |      |     |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                             |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                             |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                             |
| <b>Course ID:</b><br>FMFI.KMANM/1-MAT-430/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Course title:</b><br>Classical Methods of Solving Differential Equations |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                         |                                                                             |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                             |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                             |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                             |
| <b>Prerequisites:</b> FMFI.KMANM/1-MAT-310/00 - Ordinary Differential Equations (1)                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                             |
| <b>Course requirements:</b><br>Interim assessment: During the semester, there will be two written examinations for a total of 32 points. The student gets the next 18 points for working on the exercises according to the instructions of the assistant professor who leads them.<br>Exam: The exam consists of a written and an oral part.<br>Indicative assessment scale: A 92%, B 84%, C 76%, D 68%, E 60%<br>Scale of assessment (preliminary/final): 50/50                                                                                 |                                                                             |
| <b>Learning outcomes:</b><br>The graduate of this course has knowledge of the classical theory of basic types of partial differential equations and is able to use them to solve specific problems of linear PDR.                                                                                                                                                                                                                                                                                                                                |                                                                             |
| <b>Class syllabus:</b><br>1. First order linear PDR (characteristic method)<br>2. Wave equation - d'Alambert's formula, Kirchhoff's formula, Duhamel's principle<br>3. Heat conduction equation<br>4. Method of separation of variables<br>5. Laplace equation                                                                                                                                                                                                                                                                                   |                                                                             |
| <b>Recommended literature:</b><br>L.C. Evans: Partial Differential Equations, Graduate Studies in Mathematics, Volume 19, AMS 1998.<br>V.J. Arsenin: Matematická fyzika (Základné rovnice a špeciálne funkcie), Alfa, Bratislava 1977.<br>J. Kačur: Vybrané kapitoly z matematickej fyziky I, MFF UK, 1988.<br>D. Ševčovič: Parciálne diferenciálne rovnice, <a href="http://www.iam.fmph.uniba.sk/skripta/sevcovic">www.iam.fmph.uniba.sk/skripta/sevcovic</a><br>J. Francu: Parciální diferenciální rovnice, VUT v Brně, Fakulta strojní 1998. |                                                                             |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                             |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                             |

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|---------------------------------------------------------------------------|-------|-------|-------|-------|------|
| <b>Past grade distribution</b>                                            |       |       |       |       |      |
| Total number of evaluated students: 86                                    |       |       |       |       |      |
| A                                                                         | B     | C     | D     | E     | FX   |
| 23,26                                                                     | 22,09 | 11,63 | 19,77 | 17,44 | 5,81 |
| <b>Lecturers:</b> prof. RNDr. Ján Filo, CSc., RNDr. Kristína Rostás, PhD. |       |       |       |       |      |
| <b>Last change:</b> 21.06.2022                                            |       |       |       |       |      |
| <b>Approved by:</b>                                                       |       |       |       |       |      |

## COURSE DESCRIPTION

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------------------------------|------|-----|------|
| <b>Academic year:</b> 2021/2022                                                                                                                                                                   |       |                                              |      |     |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                 |       |                                              |      |     |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                   |       |                                              |      |     |      |
| <b>Course ID:</b><br>FMFI.KAI/1-AIN-408/15                                                                                                                                                        |       | <b>Course title:</b><br>Cognitive Laboratory |      |     |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> course<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning |       |                                              |      |     |      |
| <b>Number of credits:</b> 2                                                                                                                                                                       |       |                                              |      |     |      |
| <b>Recommended semester:</b> 1., 3., 5.                                                                                                                                                           |       |                                              |      |     |      |
| <b>Educational level:</b> I.                                                                                                                                                                      |       |                                              |      |     |      |
| <b>Prerequisites:</b>                                                                                                                                                                             |       |                                              |      |     |      |
| <b>Course requirements:</b>                                                                                                                                                                       |       |                                              |      |     |      |
| <b>Learning outcomes:</b>                                                                                                                                                                         |       |                                              |      |     |      |
| <b>Class syllabus:</b>                                                                                                                                                                            |       |                                              |      |     |      |
| <b>Recommended literature:</b>                                                                                                                                                                    |       |                                              |      |     |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                |       |                                              |      |     |      |
| <b>Notes:</b>                                                                                                                                                                                     |       |                                              |      |     |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 54                                                                                                                          |       |                                              |      |     |      |
| A                                                                                                                                                                                                 | B     | C                                            | D    | E   | FX   |
| 70,37                                                                                                                                                                                             | 12,96 | 7,41                                         | 1,85 | 0,0 | 7,41 |
| <b>Lecturers:</b> doc. PhDr. Ján Rybár, PhD.                                                                                                                                                      |       |                                              |      |     |      |
| <b>Last change:</b> 14.03.2022                                                                                                                                                                    |       |                                              |      |     |      |
| <b>Approved by:</b>                                                                                                                                                                               |       |                                              |      |     |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                         |       |                                       |      |     |     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                       |       |                                       |      |     |     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                         |       |                                       |      |     |     |
| <b>Course ID:</b><br>FMFI.KAG/1-MAT-490/00                                                                                                                                                                                                                                                                                                                                              |       | <b>Course title:</b><br>Combinatorics |      |     |     |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                      |       |                                       |      |     |     |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                             |       |                                       |      |     |     |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                                                                                                                                                                         |       |                                       |      |     |     |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                            |       |                                       |      |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                   |       |                                       |      |     |     |
| <b>Course requirements:</b><br>Continuous evaluation: homework (20 p.)<br>Final exam: written exam (80 p.)<br>Grades: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 20/80                                                                                                                                                                               |       |                                       |      |     |     |
| <b>Learning outcomes:</b><br>Understanding of algebraic interplays of some main theorems of discrete mathematics, gaining knowledge and techniques of extremal set theory and extremal graph theory.                                                                                                                                                                                    |       |                                       |      |     |     |
| <b>Class syllabus:</b><br>Systems of distinct representatives, matchings, algebraic interplays, latin squares and rectangles, finite projective planes, Dilworth theorem and extremal set theory, intersection families of sets.                                                                                                                                                        |       |                                       |      |     |     |
| <b>Recommended literature:</b><br>Algebraické metody diskrétní matematiky / Luděk Kučera, Jaroslav Nešetřil. Praha : Státní nakladatelství technické literatury, 1989<br>Combinatorial set theory : With a gentle introduction to forcing / Lorenz J. Halbeisen. London : Springer, 2012<br>Kapitoly z diskrétní matematiky / Jiří Matoušek, Jaroslav Nešetřil. Praha : Karolinum, 2003 |       |                                       |      |     |     |
| <b>Languages necessary to complete the course:</b><br>slovak, english                                                                                                                                                                                                                                                                                                                   |       |                                       |      |     |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                           |       |                                       |      |     |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 37                                                                                                                                                                                                                                                                                                                |       |                                       |      |     |     |
| A                                                                                                                                                                                                                                                                                                                                                                                       | B     | C                                     | D    | E   | FX  |
| 54,05                                                                                                                                                                                                                                                                                                                                                                                   | 29,73 | 8,11                                  | 5,41 | 2,7 | 0,0 |
| <b>Lecturers:</b> RNDr. Jana Tomanová, CSc.                                                                                                                                                                                                                                                                                                                                             |       |                                       |      |     |     |

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| <b>Last change:</b> 19.06.2022 |
| <b>Approved by:</b>            |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                  |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                  |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                  |
| <b>Course ID:</b><br>FMFI.KMANM/1-<br>MAT-737/19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Course title:</b><br>Complex Analysis Classes |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                              |                                                  |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                  |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                  |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                  |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                  |
| <b>Recommended prerequisites:</b><br>1-MAT-110 Mathematical analysis (1), 1-MAT-150 Mathematical analysis (2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                  |
| <b>Course requirements:</b><br>Final evaluation based on the semestral evaluation from mandatory subject Theory of functions of complex variable and attendance.<br>100 - 90 % A<br>89 - 80 % B<br>79 - 70 % C<br>69 - 55 % D<br>54 - 40 % E<br>less than 40 % FX<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                |                                                  |
| <b>Learning outcomes:</b><br>Students will gain basic knowledge in the field of complex analysis.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                  |
| <b>Class syllabus:</b><br>Complex numbers, complex plane. Stereographic projection. Paths, curves. Connected and linearly connected sets. The concept of convergence, limits, continuity and differentiability of functions of a complex variable. Conformal mappings. Curve integral of a function of complex variable. Closed paths integration theorems. Taylor and Laurent series. Properties of holomorphic functions. Runge's theorem. Isolated singular points of holomorphic functions. Residues and calculation of improper integrals. The argument principle and Rouché's theorem. Open mapping theorem. |                                                  |
| <b>Recommended literature:</b><br>Б.В. Шафар: ВВЕДЕНИЕ В КОМПЛЕКСНЫЙ АНАЛИЗ (in russian or english),<br>M. Demetrian: Základy teórie funkcií komplexnej premennej                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                  |
| <b>Languages necessary to complete the course:</b><br>slovak, english or russian                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                  |

**Notes:**

It is recommended to follow courses 1-MAT-210 Mathematical analysis (3), 1-MAT-250 Mathematical analysis (4) a 1-MAT-801 Topology along with this course

**Past grade distribution**

Total number of evaluated students: 29

| A     | B    | C     | D     | E     | FX    |
|-------|------|-------|-------|-------|-------|
| 24,14 | 3,45 | 17,24 | 10,34 | 20,69 | 24,14 |

**Lecturers:** Mgr. Július Pačuta, PhD.

**Last change:** 16.06.2022

**Approved by:**

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                             |       |       |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                     |       |                                             |       |       |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                       |       |                                             |       |       |      |
| <b>Course ID:</b><br>FMFI.KAMŠ/1-PMA-730/00                                                                                                                                                                                                                                                                                                                                                                                           |       | <b>Course title:</b><br>Computer Statistics |       |       |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                    |       |                                             |       |       |      |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                             |       |       |      |
| <b>Recommended semester:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                             |       |       |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                             |       |       |      |
| <b>Prerequisites:</b> FMFI.KAMŠ/1-MAT-282/00 - Probability and Statistics (2)                                                                                                                                                                                                                                                                                                                                                         |       |                                             |       |       |      |
| <b>Recommended prerequisites:</b><br>Probability and statistics (2) 1-MAT-282                                                                                                                                                                                                                                                                                                                                                         |       |                                             |       |       |      |
| <b>Course requirements:</b><br>project (teaching period), written exam using computer<br>Approximate grade thresholds: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 20/80                                                                                                                                                                                                                            |       |                                             |       |       |      |
| <b>Learning outcomes:</b><br>Using the software "R" students will be able to perform basic statistical analysis of real data.                                                                                                                                                                                                                                                                                                         |       |                                             |       |       |      |
| <b>Class syllabus:</b><br>History of R and comparison with other systems. Arithmetic, logical operators. Data import and visualization, descriptive statistics. Tests of normality. Tests about location parameters, proportions, and correlation coefficients. Linear regression: estimates, tests, confidence regions, submodels, diagnostic. ANOVA. Modern methods of statistics (cluster and discriminant analysis, Monte Carlo). |       |                                             |       |       |      |
| <b>Recommended literature:</b><br>Dalgaard P: Introductory Statistics with R. Springer 2008.<br>Anděl J: Statistické metody. Matfyzpress 2007.<br>Venables W N et al.: An Introduction to R. The R Foundation 2021.                                                                                                                                                                                                                   |       |                                             |       |       |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                 |       |                                             |       |       |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                             |       |       |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 255                                                                                                                                                                                                                                                                                                                                                             |       |                                             |       |       |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                     | B     | C                                           | D     | E     | FX   |
| 40,39                                                                                                                                                                                                                                                                                                                                                                                                                                 | 15,29 | 9,02                                        | 14,12 | 13,33 | 7,84 |
| <b>Lecturers:</b> Mgr. Ján Somorčík, PhD.                                                                                                                                                                                                                                                                                                                                                                                             |       |                                             |       |       |      |

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| <b>Last change:</b> 11.03.2022 |
| <b>Approved by:</b>            |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                  |       |       |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                                  |       |       |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                  |       |       |      |
| <b>Course ID:</b><br>FMFI.KAG/1-MAT-140/00                                                                                                                                                                                                                                                                                                                                                                                                                                    |       | <b>Course title:</b><br>Discrete Mathematics (1) |       |       |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 1 <b>per level/semester:</b> 26 / 13<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                      |       |                                                  |       |       |      |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                  |       |       |      |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                  |       |       |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                  |       |       |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                                  |       |       |      |
| <b>Course requirements:</b><br>Work during the semester: 2 midterm exams (each 18%), homework (14%)<br>Final exam: written exam (15 points needed to pass the written exam)<br>Approximate grade scheme: A 85%, B 70%, C 55%, D 45%, E 35%<br>Scale of assessment (preliminary/final): 50/50                                                                                                                                                                                  |       |                                                  |       |       |      |
| <b>Learning outcomes:</b><br>Students will acquire skills in manipulating, describing and searching for the properties of simple mathematical objects (propositions, sets, relations) with emphasis on their exact symbolic notation, details, correct interpretation, models, examples, counterexamples.<br>Students will improve in abstract reasoning, which uses formal logical arguments, relational properties of objects, and quantifiers (existential and universal). |       |                                                  |       |       |      |
| <b>Class syllabus:</b><br>Types of proofs in mathematics, propositions, propositional functions. Propositional calculus, predicate logic. The basic set operations, relations, partial orders, mappings. Finite and infinite sets, countable and uncountable sets. Cardinal numbers.                                                                                                                                                                                          |       |                                                  |       |       |      |
| <b>Recommended literature:</b><br>Množiny a všeličo okolo nich / Lev Bukovský. Košice : Univerzita Pavla Jozefa Šafárika, 2005<br>Diskrétna matematika 1 : Úvod do teórie množín, teórie booleovských funkcií a matematickej logiky / Daniel Olejár, Škoviera Martin. Bratislava : Univerzita Komenského, 1992                                                                                                                                                                |       |                                                  |       |       |      |
| <b>Languages necessary to complete the course:</b><br>English, Slovak                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                                  |       |       |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                                  |       |       |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 958                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                                  |       |       |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | B     | C                                                | D     | E     | FX   |
| 11,06                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 11,38 | 17,33                                            | 27,35 | 22,96 | 9,92 |

|                                                                            |
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| <b>Lecturers:</b> Mgr. Martin Niepel, PhD., RNDr. Jana Chalmovianská, PhD. |
| <b>Last change:</b> 14.03.2022                                             |
| <b>Approved by:</b>                                                        |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                  |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                  |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                  |
| <b>Course ID:</b><br>FMFI.KAG/1-MAT-725/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Course title:</b><br>Discrete Mathematics (2) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 1 <b>per level/semester:</b> 26 / 13<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                   |                                                  |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                  |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                  |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                  |
| <b>Prerequisites:</b> FMFI.KAG/1-MAT-140/00 - Discrete Mathematics (1)                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                  |
| <b>Course requirements:</b><br>Continuous evaluation: homework control (50 p.)<br>Final exam: written (50 p.)<br>Grades: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 50/50                                                                                                                                                                                                                                                                                                               |                                                  |
| <b>Learning outcomes:</b><br>Active use of basic enumeration methods of discrete mathematics, acquiring knowledge of specific basic topics in graph theory.                                                                                                                                                                                                                                                                                                                                                                |                                                  |
| <b>Class syllabus:</b><br>Fundamental counting rules - recurrences, inclusion/exclusion. Binomical coefficients and their properties, combinatorial identities. The basic notions in graph theory. The minimal spanning tree problem. Walks in a graph-exclusion trail, hamiltonian cycle. Drawing of a graph on a surface, planar graphs, Euler's formula. Platonic solids. Colouring of a graph, the chromatic number and the chromatic index of a graph. The Four-Colour Theorem. Pigeonhole principle, Ramsey numbers. |                                                  |
| <b>Recommended literature:</b><br>Kapitoly z diskretní matematiky / Jiří Matoušek, Jaroslav Nešetřil. Praha : Karolinum, 2000<br>Introductory combinatorics / Richard A. Brualdi. Upper Saddle River : Pearson Prentice Hall, 2004<br>Applied and algorithmic graph theory / Gary Chartrand, Ortrud R. Oellermann. New York : McGraw Hill, 1993                                                                                                                                                                            |                                                  |
| <b>Languages necessary to complete the course:</b><br>slovak, english                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                  |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                  |

|                                             |      |       |       |      |      |
|---------------------------------------------|------|-------|-------|------|------|
| <b>Past grade distribution</b>              |      |       |       |      |      |
| Total number of evaluated students: 161     |      |       |       |      |      |
| A                                           | B    | C     | D     | E    | FX   |
| 48,45                                       | 6,21 | 16,77 | 13,04 | 9,94 | 5,59 |
| <b>Lecturers:</b> RNDr. Jana Tomanová, CSc. |      |       |       |      |      |
| <b>Last change:</b> 19.06.2022              |      |       |       |      |      |
| <b>Approved by:</b>                         |      |       |       |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                      |
| <b>Course ID:</b><br>FMFI.KAMŠ/1-EFM-380/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Course title:</b><br>Econometrics |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                       |                                      |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                      |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                      |
| <b>Educational level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                      |
| <b>Prerequisites:</b> FMFI.KAMŠ/1-EFM-330/00 - Statistical Methods or FMFI.KAMŠ/2-MMN-106/15 - Computer Statistics or FMFI.KAMŠ/2-PMS-107/15 - Regression Models or FMFI.KAMŠ/1-DAV-303/20 - Statistical Methods or FMFI.KAMŠ/1-PMA-510/00 - Basics of Mathematical Statistics                                                                                                                                                                                                                                                                                                                 |                                      |
| <b>Recommended prerequisites:</b><br>Statistical methods 1-EFM-330 or Statistical methods 1-DAV-303 or Computer statistics 2-MMN-106                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                      |
| <b>Course requirements:</b><br>Continuing evaluation: project (10%) and test (20%); at least 10% out of 30% are needed to proceed to the final exam<br>Exam: written exam<br>Approximate grade thresholds: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 30/70                                                                                                                                                                                                                                                                                                 |                                      |
| <b>Learning outcomes:</b><br>Students are able to perform standard linear regression analysis and also are able to apply it in real econometric research. They also understand the mathematics behind these methods, being a necessary condition for further studies in this subject.                                                                                                                                                                                                                                                                                                          |                                      |
| <b>Class syllabus:</b><br>Linear regression, the geometry behind it, and LS-estimators of parameters. Decomposition of the Total Sum of Squares, coefficients of determination, and the Akaike information criterion. Properties of the parameter estimators and of the error term variance estimator. Gauss-Markov theorem. Tests of linear hypotheses about parameters. Restricted regression. Model specification errors and their diagnostic. Dummy variables. Generalized least squares. Heteroscedasticity: testing for and dealing with. Autocorrelation: testing for and dealing with. |                                      |
| <b>Recommended literature:</b><br>Johnston J, DiNardo J: Econometric methods 4th ed. McGraw Hill 1997;<br>Greene W: Econometric Analysis 8th ed. Pearson 2017;<br>Zvára K: Regrese. MatfyzPress, 2008.                                                                                                                                                                                                                                                                                                                                                                                         |                                      |

|                                                                                |       |       |       |       |      |
|--------------------------------------------------------------------------------|-------|-------|-------|-------|------|
| <b>Languages necessary to complete the course:</b><br>Slovak, English          |       |       |       |       |      |
| <b>Notes:</b>                                                                  |       |       |       |       |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 1187     |       |       |       |       |      |
| A                                                                              | B     | C     | D     | E     | FX   |
| 28,22                                                                          | 16,01 | 18,37 | 17,02 | 16,93 | 3,45 |
| <b>Lecturers:</b> Mgr. Ján Somorčík, PhD., Mgr. Samuel Rosa, PhD., Pál Somogyi |       |       |       |       |      |
| <b>Last change:</b> 25.06.2022                                                 |       |       |       |       |      |
| <b>Approved by:</b>                                                            |       |       |       |       |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                                         |      |     |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                       |       |                                                         |      |     |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                         |       |                                                         |      |     |      |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-233/13                                                                                                                                                                                                                                                                                                                                                                                              |       | <b>Course title:</b><br>English Conversation Course (1) |      |     |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                   |       |                                                         |      |     |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                                         |      |     |      |
| <b>Recommended semester:</b> 3., 5.                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                                         |      |     |      |
| <b>Educational level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                                         |      |     |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                         |      |     |      |
| <b>Course requirements:</b><br>tests, presentations, essays<br>Course prerequisites:<br><a href="https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezhneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/">https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezhneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/</a><br>Scale of assessment (preliminary/final): 100/0 |       |                                                         |      |     |      |
| <b>Learning outcomes:</b><br>Continual improvement of all language skills focused on communication/speaking, listening comprehension and writing. The emphasis is on discourse, lexicology and morphology, word-bank broadening of communicational English as well as English for specific purposes appropriate for university students. This course is a follow up of the previously taught ESP course.                                |       |                                                         |      |     |      |
| <b>Class syllabus:</b><br>This course's focus is to broaden spoken/communicational English for students with B2/C1 level of English knowledge.                                                                                                                                                                                                                                                                                          |       |                                                         |      |     |      |
| <b>Recommended literature:</b><br>Appropriate study material is supplied based on the participants' level of English by the lecturer. (Sources- The Guardian, The Herald Morning Sun. The Nine News, The West Australian, BBC News and podcasts, CNN podcasts).                                                                                                                                                                         |       |                                                         |      |     |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                      |       |                                                         |      |     |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                                         |      |     |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 215                                                                                                                                                                                                                                                                                                                                                               |       |                                                         |      |     |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                       | B     | C                                                       | D    | E   | FX   |
| 67,44                                                                                                                                                                                                                                                                                                                                                                                                                                   | 13,02 | 6,51                                                    | 1,86 | 1,4 | 9,77 |
| <b>Lecturers:</b> Mgr. Aneta Barnes                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                                         |      |     |      |

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| <b>Last change:</b> 21.06.2022 |
| <b>Approved by:</b>            |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                                         |      |     |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                            |       |                                                         |      |     |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                              |       |                                                         |      |     |      |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-234/13                                                                                                                                                                                                                                                                                                                                                                                                   |       | <b>Course title:</b><br>English Conversation Course (2) |      |     |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                               |       |                                                         |      |     |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                         |      |     |      |
| <b>Recommended semester:</b> 4., 6.                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                                         |      |     |      |
| <b>Educational level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                                         |      |     |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                                         |      |     |      |
| <b>Course requirements:</b><br>tests, oral presentations, essays<br>Course prerequisites:<br><a href="https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezhneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/">https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezhneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/</a><br>Scale of assessment (preliminary/final): 100/0 |       |                                                         |      |     |      |
| <b>Learning outcomes:</b><br>Continual improvement of all language skills focused on communication/speaking, listening comprehension and writing. The emphasis is on discourse, lexicology and morphology, word-bank broadening of communicational/spoken English as well as English for specific purpose appropriate for university students. This course is a follow up of the Conversational English course 1.                            |       |                                                         |      |     |      |
| <b>Class syllabus:</b><br>This course's focus is to broaden spoken/communicational English for students with B2/C1 level of English knowledge( Upper-Intermediate/Lower Advanced).                                                                                                                                                                                                                                                           |       |                                                         |      |     |      |
| <b>Recommended literature:</b><br>Appropriate study material is supplied based on the participants'level of English by the lecturer. (Sources- The Guardian, The Herald Morning Sun. The Nine News, The West Australian, BBC News and podcasts, CNN podcasts).                                                                                                                                                                               |       |                                                         |      |     |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                           |       |                                                         |      |     |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                                         |      |     |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 146                                                                                                                                                                                                                                                                                                                                                                    |       |                                                         |      |     |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                            | B     | C                                                       | D    | E   | FX   |
| 77,4                                                                                                                                                                                                                                                                                                                                                                                                                                         | 12,33 | 3,42                                                    | 1,37 | 0,0 | 5,48 |
| <b>Lecturers:</b> Mgr. Aneta Barnes                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                                         |      |     |      |

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| <b>Last change:</b> 21.06.2022 |
| <b>Approved by:</b>            |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                              |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                              |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                              |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-131/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Course title:</b><br>English Language (1) |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                              |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                              |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                              |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                              |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |
| <b>Course requirements:</b><br>Grades: A 93%, B 85%, C 77%, D 70%, E 65%<br>Course prerequisites:<br><a href="https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebežneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/">https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebežneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/</a><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                              |
| <b>Learning outcomes:</b><br>The objective of the subject is to provide the students with experience and knowledge of technical English and thus make them ready to use English sources of information for later study and professional career.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                              |
| <b>Class syllabus:</b><br>On entering the first semester, students' knowledge of English is tested and they are divided into groups according to the results of the placement test. In the groups of pre-intermediate and intermediate students, fundamentals of technical English are taught. Advanced students take classes of technical English for their field of study: English for mathematics, for physics, for computer science, English for management and economic and financial mathematics.                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                              |
| <b>Recommended literature:</b><br>Anglický jazyk pre študentov FMFI UK : Kurz pre mierne pokročilých / Alena Zemanová.<br>The textbook has not been published. It is at students' disposal in an electronic format.<br>Anglický jazyk pre študentov FMFI UK : Aplikovaná matematika / Alexandra Maďarová, Ľubomíra Kožehubová.<br>The textbook has not been published. It is at students' disposal in an electronic format.<br>Anglický jazyk pre študentov FMFI UK : Matematika / kolektív autorov KJP.<br>The textbook has not been published. It is at students' disposal in an electronic format.<br>Anglický jazyk pre študentov FMFI UK : Fyzika / Alena Zemanová.<br>The textbook has not been published. It is at students' disposal in an electronic format.<br>Anglický jazyk pre študentov FMFI UK : Informatika / Elena Klátiková.<br>The textbook has not been published. It is at students' disposal in an electronic format. |                                              |

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| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                   |      |       |       |      |     |
| <b>Notes:</b>                                                                                                                                                                           |      |       |       |      |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 5840                                                                                                              |      |       |       |      |     |
| A                                                                                                                                                                                       | B    | C     | D     | E    | FX  |
| 30,6                                                                                                                                                                                    | 23,8 | 18,29 | 12,47 | 7,45 | 7,4 |
| <b>Lecturers:</b> Mgr. Eva Foltánová, Mgr. Ing. Jana Kočvarová, Mgr. Ľubomíra Kožehubová, Mgr. Alexandra Maďarová, PhDr. Alena Zemanová, Mgr. Aneta Barnes, Mgr. Simona Tomášková, PhD. |      |       |       |      |     |
| <b>Last change:</b> 20.06.2022                                                                                                                                                          |      |       |       |      |     |
| <b>Approved by:</b>                                                                                                                                                                     |      |       |       |      |     |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                              |       |       |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                              |       |       |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                      |       |                                              |       |       |      |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-132/00                                                                                                                                                                                                                                                                                                                                                                                                           |       | <b>Course title:</b><br>English Language (2) |       |       |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                       |       |                                              |       |       |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                              |       |       |      |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                              |       |       |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                              |       |       |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                              |       |       |      |
| <b>Course requirements:</b><br>Grades: A 93%, B 85%, C 77%, D 70%, E 65%<br>Course prerequisites:<br><a href="https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezhneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/">https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezhneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/</a><br>Scale of assessment (preliminary/final): 100/0 |       |                                              |       |       |      |
| <b>Learning outcomes:</b><br>The objective of the subject is to provide the students with experience and knowledge of technical English and thus make them ready to use English sources of information for later study and professional career.                                                                                                                                                                                                      |       |                                              |       |       |      |
| <b>Class syllabus:</b><br>This is a continuation of the course English (1) designed for pre-intermediate students. Fundamental vocabulary is presented through selected topics in mathematics, physics and informatics. The lessons also contain revision of elementary grammar. Generally, it is a necessary preliminary to advanced programs.                                                                                                      |       |                                              |       |       |      |
| <b>Recommended literature:</b><br>Anglický jazyk pre študentov FMFI UK : Kurz pre mierne pokročilých / Alena Zemanová.<br>The textbook has not been published. It is at students' disposal in an electronic format.                                                                                                                                                                                                                                  |       |                                              |       |       |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                |       |                                              |       |       |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                              |       |       |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 1582                                                                                                                                                                                                                                                                                                                                                                           |       |                                              |       |       |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                    | B     | C                                            | D     | E     | FX   |
| 22,06                                                                                                                                                                                                                                                                                                                                                                                                                                                | 20,54 | 24,27                                        | 15,36 | 10,81 | 6,95 |

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| <b>Lecturers:</b> PhDr. Alena Zemanová, Mgr. Ing. Jana Kočvarová, Mgr. Alexandra Maďarová, Mgr. Lubomíra Kožehubová, Mgr. Eva Foltánová, Mgr. Aneta Barnes, Mgr. Simona Tomášková, PhD. |
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| <b>Last change:</b> 20.06.2022 |
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| <b>Approved by:</b> |
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## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                              |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                              |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                              |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-231/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Course title:</b><br>English Language (3) |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                              |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                              |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                              |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                              |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |
| <b>Course requirements:</b><br>Grades: A 93%, B 85%, C 77%, D 70%, E 65%<br>Course prerequisites:<br><a href="https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebežneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/">https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebežneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/</a><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                              |
| <b>Learning outcomes:</b><br>The objective of the classes is to provide the students with knowledge of technical English in their field of study and experience with technical English sources sufficient to make the able to use technical language for their later study and professional purposes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |
| <b>Class syllabus:</b><br>The subject continues the program of English (2). Students take classes of special English for their field of study: English for mathematics, English for physics, English for computer science, English for management and economic and financial mathematics.<br>The subject requires advanced knowledge of general English.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                              |
| <b>Recommended literature:</b><br>Anglický jazyk pre študentov FMFI UK : Kurz pre mierne pokročilých / Alena Zemanová.<br>The textbook has not been published. It is at students' disposal in an electronic format.<br>Anglický jazyk pre študentov FMFI UK : Aplikovaná matematika / Alexandra Maďarová, Ľubomíra Kožehubová.<br>The textbook has not been published. It is at students' disposal in an electronic format.<br>Anglický jazyk pre študentov FMFI UK : Matematika / kolektív autorov KJP.<br>The textbook has not been published. It is at students' disposal in an electronic format.<br>Anglický jazyk pre študentov FMFI UK : Fyzika / Alena Zemanová.<br>The textbook has not been published. It is at students' disposal in an electronic format.<br>Anglický jazyk pre študentov FMFI UK : Informatika / Elena Klátiková.<br>The textbook has not been published. It is at students' disposal in an electronic format. |                                              |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                              |

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| Slovak, English                                                                                                                                                                         |       |       |      |      |      |
| <b>Notes:</b>                                                                                                                                                                           |       |       |      |      |      |
| <b>Past grade distribution</b>                                                                                                                                                          |       |       |      |      |      |
| Total number of evaluated students: 1326                                                                                                                                                |       |       |      |      |      |
| A                                                                                                                                                                                       | B     | C     | D    | E    | FX   |
| 16,06                                                                                                                                                                                   | 19,53 | 23,23 | 18,1 | 17,5 | 5,58 |
| <b>Lecturers:</b> PhDr. Alena Zemanová, Mgr. Ing. Jana Kočvarová, Mgr. Alexandra Maďarová, Mgr. Lubomíra Kožehubová, Mgr. Eva Foltánová, Mgr. Aneta Barnes, Mgr. Simona Tomášková, PhD. |       |       |      |      |      |
| <b>Last change:</b> 20.06.2022                                                                                                                                                          |       |       |      |      |      |
| <b>Approved by:</b>                                                                                                                                                                     |       |       |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                              |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                              |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                              |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-232/10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Course title:</b><br>English Language (4) |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                              |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                              |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                              |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |
| <b>Course requirements:</b><br>Examination: an examination consisting of a written and an oral part.<br>Grades: A 93%, B 85%, C 77%, D 70%, E 65%<br>Course prerequisites:<br><a href="https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/skuska-z-predmetu-anglicky-jazyk-4/">https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/skuska-z-predmetu-anglicky-jazyk-4/</a><br>Scale of assessment (preliminary/final): 0/100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |
| <b>Learning outcomes:</b><br>After completing the course, students will be able to work independently with professional literature in English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                              |
| <b>Class syllabus:</b><br>Students take classes of special English for their field of study: English for mathematics, English for physics, English for computer science, English for management and economic and financial mathematics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                              |
| <b>Recommended literature:</b><br>Anglický jazyk pre študentov FMFI UK : Kurz pre mierne pokročilých / Alena Zemanová.<br>The textbook has not been published. It is at students' disposal in an electronic format.<br>Anglický jazyk pre študentov FMFI UK : Aplikovaná matematika / Alexandra Maďarová, Ľubomíra Kožehubová.<br>The textbook has not been published. It is at students' disposal in an electronic format.<br>Anglický jazyk pre študentov FMFI UK : Matematika / kolektív autorov KJP.<br>The textbook has not been published. It is at students' disposal in an electronic format.<br>Anglický jazyk pre študentov FMFI UK : Fyzika / Alena Zemanová.<br>The textbook has not been published. It is at students' disposal in an electronic format.<br>Anglický jazyk pre študentov FMFI UK : Informatika / Elena Klátiková.<br>The textbook has not been published. It is at students' disposal in an electronic format. |                                              |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |

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| <b>Notes:</b>                                                                                                                                                                           |      |       |       |      |     |
| <b>Past grade distribution</b>                                                                                                                                                          |      |       |       |      |     |
| Total number of evaluated students: 3345                                                                                                                                                |      |       |       |      |     |
| A                                                                                                                                                                                       | B    | C     | D     | E    | FX  |
| 27,23                                                                                                                                                                                   | 28,4 | 21,29 | 11,21 | 5,77 | 6,1 |
| <b>Lecturers:</b> Mgr. Ing. Jana Kočvarová, Mgr. Alexandra Maďarová, PhDr. Alena Zemanová, Mgr. Lubomíra Kožehubová, Mgr. Eva Foltánová, Mgr. Aneta Barnes, Mgr. Simona Tomášková, PhD. |      |       |       |      |     |
| <b>Last change:</b> 17.06.2022                                                                                                                                                          |      |       |       |      |     |
| <b>Approved by:</b>                                                                                                                                                                     |      |       |       |      |     |

## COURSE DESCRIPTION

|                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                    |                                                                 |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                  |                                                                 |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                    |                                                                 |
| <b>Course ID:</b><br>FMFI.KAG+KAI/1-<br>MAT-575/00                                                                                                                                                                                                                                                                                                                                                                 | <b>Course title:</b><br>Figure Recognition and Image Processing |
| <b>Educational activities:</b><br><b>Type of activities:</b> course<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                  |                                                                 |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                                        |                                                                 |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                                                                                                                                                                                                    |                                                                 |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                       |                                                                 |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                              |                                                                 |
| <b>Course requirements:</b><br>It is necessary to obtain at least 90% of the points to obtain A grade, at least 80% of points to grade B, at least 70% of points to grade C, at least 60% to grade D and at least 50% to grade E.<br>For the semester, the student can get 30% for independent work and activity.<br>The final written exam has a weight of 70%.<br>Scale of assessment (preliminary/final): 30/70 |                                                                 |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                                                                                                                                          |                                                                 |
| <b>Class syllabus:</b><br>Image acquisition.<br>Properties of digital image.<br>Image transformations.<br>Methods of image pre-processing.<br>Segmentation.<br>Representation of shape and its description.<br>Pattern recognition.<br>Statistical and syntactic methods of recognition<br>Mathematical morphology.<br>Processing of textures.                                                                     |                                                                 |
| <b>Recommended literature:</b><br>Gonzalez, Woods: Digital Image processing, 1992<br>Hlaváč - Šonka: Počítačové vidění, 1992<br>Boyle - Šonka - Hlaváč: Image procesing, analysis and machine vision, 1999                                                                                                                                                                                                         |                                                                 |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                 |                                                                 |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                 |

|                                                |       |       |       |     |      |
|------------------------------------------------|-------|-------|-------|-----|------|
| <b>Past grade distribution</b>                 |       |       |       |     |      |
| Total number of evaluated students: 107        |       |       |       |     |      |
| A                                              | B     | C     | D     | E   | FX   |
| 22,43                                          | 28,04 | 30,84 | 12,15 | 2,8 | 3,74 |
| <b>Lecturers:</b> RNDr. Zuzana Černeková, PhD. |       |       |       |     |      |
| <b>Last change:</b> 23.06.2022                 |       |       |       |     |      |
| <b>Approved by:</b>                            |       |       |       |     |      |

## COURSE DESCRIPTION

|                                                                                                                                                                                                                                                                       |      |                                             |      |     |      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------------------------------------|------|-----|------|
| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                       |      |                                             |      |     |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                     |      |                                             |      |     |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                       |      |                                             |      |     |      |
| <b>Course ID:</b><br>FMFL.KJP/1-MXX-141/00                                                                                                                                                                                                                            |      | <b>Course title:</b><br>French Language (1) |      |     |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                 |      |                                             |      |     |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                           |      |                                             |      |     |      |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                       |      |                                             |      |     |      |
| <b>Educational level:</b> I., II.                                                                                                                                                                                                                                     |      |                                             |      |     |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                 |      |                                             |      |     |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                         |      |                                             |      |     |      |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                             |      |                                             |      |     |      |
| <b>Class syllabus:</b><br>French language is taught at two levels: beginner and intermediate. Students opt for one of them depending on whether they wish to obtain the fundamentals of the language or wish to maintain and/or improve previous knowledge of French. |      |                                             |      |     |      |
| <b>Recommended literature:</b><br>Capelle Guy, Menand Robert: Le Nouveau taxi 1, Hachette FLE Paris, France 2009, ISBN 978-2-01-155548 - 9                                                                                                                            |      |                                             |      |     |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                    |      |                                             |      |     |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                         |      |                                             |      |     |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 435                                                                                                                                                                                             |      |                                             |      |     |      |
| A                                                                                                                                                                                                                                                                     | B    | C                                           | D    | E   | FX   |
| 45,75                                                                                                                                                                                                                                                                 | 20,0 | 18,85                                       | 8,74 | 2,3 | 4,37 |
| <b>Lecturers:</b> Mgr. Ľubomíra Kožehubová                                                                                                                                                                                                                            |      |                                             |      |     |      |
| <b>Last change:</b> 20.06.2022                                                                                                                                                                                                                                        |      |                                             |      |     |      |
| <b>Approved by:</b>                                                                                                                                                                                                                                                   |      |                                             |      |     |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                       |       |                                             |       |      |     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                     |       |                                             |       |      |     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                       |       |                                             |       |      |     |
| <b>Course ID:</b><br>FMFL.KJP/1-MXX-142/00                                                                                                                                                            |       | <b>Course title:</b><br>French Language (2) |       |      |     |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning |       |                                             |       |      |     |
| <b>Number of credits:</b> 2                                                                                                                                                                           |       |                                             |       |      |     |
| <b>Recommended semester:</b> 2.                                                                                                                                                                       |       |                                             |       |      |     |
| <b>Educational level:</b> I., II.                                                                                                                                                                     |       |                                             |       |      |     |
| <b>Prerequisites:</b>                                                                                                                                                                                 |       |                                             |       |      |     |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                         |       |                                             |       |      |     |
| <b>Learning outcomes:</b>                                                                                                                                                                             |       |                                             |       |      |     |
| <b>Class syllabus:</b><br>The subject continues the program of French language (1) and provides courses of essential and intermediate French language.                                                |       |                                             |       |      |     |
| <b>Recommended literature:</b><br>Capelle Guy, Menand Robert: Le Nouveau taxi 1, Hachette FLE Paris, France 2009, ISBN 978-2-01-155548 - 9                                                            |       |                                             |       |      |     |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                    |       |                                             |       |      |     |
| <b>Notes:</b>                                                                                                                                                                                         |       |                                             |       |      |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 265                                                                                                                             |       |                                             |       |      |     |
| A                                                                                                                                                                                                     | B     | C                                           | D     | E    | FX  |
| 38,87                                                                                                                                                                                                 | 25,28 | 19,62                                       | 10,19 | 2,64 | 3,4 |
| <b>Lecturers:</b> Mgr. Ľubomíra Kožehubová                                                                                                                                                            |       |                                             |       |      |     |
| <b>Last change:</b> 20.06.2022                                                                                                                                                                        |       |                                             |       |      |     |
| <b>Approved by:</b>                                                                                                                                                                                   |       |                                             |       |      |     |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                |       |                                             |      |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                              |       |                                             |      |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                |       |                                             |      |      |      |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-241/00                                                                                                                                                     |       | <b>Course title:</b><br>French Language (3) |      |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning |       |                                             |      |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                    |       |                                             |      |      |      |
| <b>Recommended semester:</b> 3.                                                                                                                                                                |       |                                             |      |      |      |
| <b>Educational level:</b> I., II.                                                                                                                                                              |       |                                             |      |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                          |       |                                             |      |      |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                  |       |                                             |      |      |      |
| <b>Learning outcomes:</b>                                                                                                                                                                      |       |                                             |      |      |      |
| <b>Class syllabus:</b><br>The subject provides a course of intermediate French language, covering not only general, but also technical language.                                               |       |                                             |      |      |      |
| <b>Recommended literature:</b><br>Capelle Guy, Menand Robert: Le Nouveau taxi 1, Hachette FLE Paris, France 2009, ISBN 978-2-01-155548 - 9                                                     |       |                                             |      |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                             |       |                                             |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                  |       |                                             |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 104                                                                                                                      |       |                                             |      |      |      |
| A                                                                                                                                                                                              | B     | C                                           | D    | E    | FX   |
| 39,42                                                                                                                                                                                          | 27,88 | 21,15                                       | 6,73 | 0,96 | 3,85 |
| <b>Lecturers:</b> Mgr. Ľubomíra Kožehubová                                                                                                                                                     |       |                                             |      |      |      |
| <b>Last change:</b> 20.06.2022                                                                                                                                                                 |       |                                             |      |      |      |
| <b>Approved by:</b>                                                                                                                                                                            |       |                                             |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                       |       |                                             |     |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                     |       |                                             |     |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                       |       |                                             |     |      |      |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-242/00                                                                                                                                                            |       | <b>Course title:</b><br>French Language (4) |     |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning |       |                                             |     |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                           |       |                                             |     |      |      |
| <b>Recommended semester:</b> 4.                                                                                                                                                                       |       |                                             |     |      |      |
| <b>Educational level:</b> I., II.                                                                                                                                                                     |       |                                             |     |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                 |       |                                             |     |      |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                         |       |                                             |     |      |      |
| <b>Learning outcomes:</b>                                                                                                                                                                             |       |                                             |     |      |      |
| <b>Class syllabus:</b><br>The subject provides a course of intermediate French covering not only general, but also technical French language.                                                         |       |                                             |     |      |      |
| <b>Recommended literature:</b><br>Menand Robert: Le Nouveau taxi 2, Hachette FLE, Paris, France 2009, ISBN 978-2-01-155551 - 9                                                                        |       |                                             |     |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                    |       |                                             |     |      |      |
| <b>Notes:</b>                                                                                                                                                                                         |       |                                             |     |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 74                                                                                                                              |       |                                             |     |      |      |
| A                                                                                                                                                                                                     | B     | C                                           | D   | E    | FX   |
| 41,89                                                                                                                                                                                                 | 32,43 | 17,57                                       | 2,7 | 1,35 | 4,05 |
| <b>Lecturers:</b> Mgr. Ľubomíra Kožehubová                                                                                                                                                            |       |                                             |     |      |      |
| <b>Last change:</b> 20.06.2022                                                                                                                                                                        |       |                                             |     |      |      |
| <b>Approved by:</b>                                                                                                                                                                                   |       |                                             |     |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                                 |       |       |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                                 |       |       |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                                 |       |       |      |
| <b>Course ID:</b><br>FMFI.KMANM/1-MAT-410/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       | <b>Course title:</b><br>Functional Analysis (1) |       |       |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                                 |       |       |      |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                                 |       |       |      |
| <b>Recommended semester:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                                 |       |       |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                                 |       |       |      |
| <b>Prerequisites:</b> FMFI.KMANM/1-MAT-250/14 - Mathematical Analysis (4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                                 |       |       |      |
| <b>Recommended prerequisites:</b><br>Elements of differential and integral calculus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                                 |       |       |      |
| <b>Course requirements:</b><br>Continuous assessment: handwriting Exam: oral Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 30/70                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                                 |       |       |      |
| <b>Learning outcomes:</b><br>Introduction to linear functional analysis.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                                 |       |       |      |
| <b>Class syllabus:</b><br>Linear normed spaces, linear functionals and operators, Hahn-Banach Theorem, dual operators, Banach spaces, Banach-Stienhaus Theorem, differences between finite-dimensional and infinite-dimensional spaces, weak convergence, reflexivity, Lebesgue integral, limit theorems, measures on product spaces, Fubini theorem, Lp-spaces, Hilbert spaces, theorem on orthogonal projections, Riesz Representation Theorem, Bessel inequality, Fourier coefficients, orthonormal bases, the space of continuous functions, Stone-Weierstrass Theorem, Arzeal-Ascoli Lemma, the dual space of C(I). |       |                                                 |       |       |      |
| <b>Recommended literature:</b><br>W. Rudin: Analýza v reálném a komplexním oboru, Academia, Praha, 1977.<br>A. N. Kolmogorov - S. V. Fomin: Základy teórie funkcí a funkcionální analýzy, 1975.<br>A. E. Taylor: Úvod do funkcionální analýzy, Academia, Praha, 1973.                                                                                                                                                                                                                                                                                                                                                    |       |                                                 |       |       |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                                 |       |       |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                                 |       |       |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 107                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                                 |       |       |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | B     | C                                               | D     | E     | FX   |
| 33,64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 20,56 | 13,08                                           | 15,89 | 12,15 | 4,67 |

|                                                                              |
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| <b>Lecturers:</b> prof. RNDr. Michal Fečkan, DrSc., Mgr. Július Pačuta, PhD. |
| <b>Last change:</b> 14.03.2022                                               |
| <b>Approved by:</b>                                                          |

## COURSE DESCRIPTION

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                 |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                 |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                 |
| <b>Course ID:</b><br>FMFI.KMANM/1-<br>MAT-411/15                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Course title:</b><br>Functional Analysis (2) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                             |                                                 |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                 |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                 |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                 |
| <b>Prerequisites:</b> FMFI.KMANM/1-MAT-410/00 - Functional Analysis (1)                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                 |
| <b>Recommended prerequisites:</b><br>Recommended 1-MAT-410 Funkcionálna analýza (1)                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                 |
| <b>Antirequisites:</b> FMFI.KMANM/1-MAT-411/12                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                 |
| <b>Course requirements:</b><br>Continuous assessment: handwriting<br>Exam: oral<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 40/60                                                                                                                                                                                                                                                                                                  |                                                 |
| <b>Learning outcomes:</b><br>Advanced course in linear functional analysis.                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                 |
| <b>Class syllabus:</b><br>1. Integrable functional spaces.<br>2. Dual spaces.<br>3. Approximation theorems.<br>4. Compactness.<br>5. Convex sets.<br>6. Factor space.                                                                                                                                                                                                                                                                                                                                |                                                 |
| <b>Recommended literature:</b><br>Teória lineárnych operátorov v technických a prírodných vedách / Arch W. Naylor, George R. Sell ; preklad z angličtiny Jozef Dravecký, Peter Mederly. Bratislava : Alfa, 1981<br>Základy teorie funkcí a funkcionální analýzy / A. N. Kolmogorov, S. V. Fomin ; přeložili z ruštiny Vladimír Doležal, Zdeněk Tichý. Praha : Státní nakladatelství technické literatury, 1975<br>Introduction to functional analysis / Angus E. Taylor. New York : John Wiley, 1958 |                                                 |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                 |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                 |

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|------------------------------------------------------------------------------|-------|------|-----|-----|-------|
| <b>Past grade distribution</b>                                               |       |      |     |     |       |
| Total number of evaluated students: 13                                       |       |      |     |     |       |
| A                                                                            | B     | C    | D   | E   | FX    |
| 53,85                                                                        | 23,08 | 7,69 | 0,0 | 0,0 | 15,38 |
| <b>Lecturers:</b> prof. RNDr. Michal Fečkan, DrSc., Mgr. Július Pačuta, PhD. |       |      |     |     |       |
| <b>Last change:</b> 12.03.2022                                               |       |      |     |     |       |
| <b>Approved by:</b>                                                          |       |      |     |     |       |

## STATE EXAM DESCRIPTION

|                                                                 |                                                     |
|-----------------------------------------------------------------|-----------------------------------------------------|
| <b>Academic year:</b> 2021/2022                                 |                                                     |
| <b>University:</b> Comenius University Bratislava               |                                                     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics |                                                     |
| <b>Course ID:</b><br>FMFI.KMANM/1-<br>MAT-951/15                | <b>Course title:</b><br>Fundamentals of Mathematics |
| <b>Number of credits:</b> 6                                     |                                                     |
| <b>Educational level:</b> I.                                    |                                                     |
| <b>State exam syllabus:</b>                                     |                                                     |
| <b>Last change:</b> 29.10.2015                                  |                                                     |
| <b>Approved by:</b>                                             |                                                     |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                     |
| <b>Course ID:</b><br>FMFI.KTF/1-MAT-815/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Course title:</b><br>Fundamentals of Physics (1) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                           |                                                     |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                     |
| <b>Recommended semester:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                     |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                     |
| <b>Prerequisites:</b> FMFI.KMANM/1-MAT-250/14 - Mathematical Analysis (4) or FMFI.KAMŠ/1-DAV-102/20 - Calculus (1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                     |
| <b>Recommended prerequisites:</b><br>1-MAT-150 Mathematical analysis (2) AND 1-MAT-160 Linear algebra and geometry (2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                     |
| <b>Course requirements:</b><br>Semester grading based on homework.<br>Informative grading scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                               |                                                     |
| <b>Learning outcomes:</b><br>The course will enable the students to understand the basic physics concepts, terminology and notation, as well as the importance and usage of these. They will be familiar with the most important physics approaches and problems, they will know how to solve these and will be able to interpret them. They will have the necessary skills to independently study the basic physics and technical literature. The first semester concentrates on topics from mechanics, however students will be able to understand problems from other areas of physics as well. |                                                     |
| <b>Class syllabus:</b><br>kinematics and dynamics of a point mass, Newton laws of motion, potential forces, harmonic oscillator, central potentials, collisions, two body problem a and many body problem, dynamics of collections of point masses, waves and oscillations, inertial and non-inertial reference frames, laws of motion in non-inertial reference frames, introduction to special theory of relativity; it is possible to include different topics according to needs and interests of the students                                                                                 |                                                     |
| <b>Recommended literature:</b><br>Feynmanovy přednášky z fyziky s řešenými příklady 1/3 / Richard P. Feynman, Robert B. Leighton, Matthew Sands. Havlíčkův Brod : Fragment, 2001<br>Lecture notes by the lecturer available at the website of the course.                                                                                                                                                                                                                                                                                                                                          |                                                     |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                     |

|                                          |       |      |      |     |     |
|------------------------------------------|-------|------|------|-----|-----|
| <b>Past grade distribution</b>           |       |      |      |     |     |
| Total number of evaluated students: 48   |       |      |      |     |     |
| A                                        | B     | C    | D    | E   | FX  |
| 70,83                                    | 16,67 | 8,33 | 4,17 | 0,0 | 0,0 |
| <b>Lecturers:</b> Mgr. Juraj Tekel, PhD. |       |      |      |     |     |
| <b>Last change:</b> 15.03.2022           |       |      |      |     |     |
| <b>Approved by:</b>                      |       |      |      |     |     |

## COURSE DESCRIPTION

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                     |
| <b>Course ID:</b><br>FMFI.KTF/1-MAT-825/00                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Course title:</b><br>Fundamentals of Physics (2) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 1 <b>per level/semester:</b> 26 / 13<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                          |                                                     |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                     |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                     |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                     |
| <b>Prerequisites:</b> FMFI.KTF/1-MAT-815/00 - Fundamentals of Physics (1) or FMFI.KAMŠ/1-DAV-112/20 - Calculus (2)                                                                                                                                                                                                                                                                                                                                                                |                                                     |
| <b>Recommended prerequisites:</b><br>1-MAT-815 Fundamentals of physics (1) AND 1-MAT-250 Mathematical analysis (4) AND 1-MAT-310 Ordinary differential equations (1)                                                                                                                                                                                                                                                                                                              |                                                     |
| <b>Course requirements:</b><br>Semester grading based on homework.<br>Informative grading scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                              |                                                     |
| <b>Learning outcomes:</b><br>The course will enable the students to understand and find their way in a wide range of various areas of physics. They will understand the basic concepts and terminology in these areas and will be familiar with the most important problems. They will have the necessary skills for independent study of more advanced literature, including research papers.                                                                                    |                                                     |
| <b>Class syllabus:</b><br>Lagrange formulation of classical mechanics, least action principle, selected topics from hydrodynamics, Euler and Navier-Stokes equations, electrostatics, electric currents, magnetism, Maxwell equations, scalar and vector potentials, theory of electromagnetic field and electrodynamics, quantum mechanics - formulation and most important results; it is possible to include different topics according to needs and interests of the students |                                                     |
| <b>Recommended literature:</b><br>Feynmanovy přednášky z fyziky s řešenými příklady 2/3 / Feynman, Leighton, Sands. Praha : Fragment, 2001<br>Lecture notes by the lecturer available at the website of the course.                                                                                                                                                                                                                                                               |                                                     |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                             |                                                     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                     |

|                                          |     |     |     |     |     |
|------------------------------------------|-----|-----|-----|-----|-----|
| <b>Past grade distribution</b>           |     |     |     |     |     |
| Total number of evaluated students: 14   |     |     |     |     |     |
| A                                        | B   | C   | D   | E   | FX  |
| 100,0                                    | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 |
| <b>Lecturers:</b> Mgr. Juraj Tekel, PhD. |     |     |     |     |     |
| <b>Last change:</b> 15.03.2022           |     |     |     |     |     |
| <b>Approved by:</b>                      |     |     |     |     |     |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                          |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                          |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                          |
| <b>Course ID:</b><br>FMFI.KAG/1-MAT-565/15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Course title:</b><br>Geometric Objects Representation |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                          |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                          |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                          |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                          |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                          |
| <b>Recommended prerequisites:</b><br>none                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                          |
| <b>Antirequisites:</b> FMFI.KAGDM/1-MAT-565/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                          |
| <b>Course requirements:</b><br>Preliminary assessment: tests, projects<br>Final assessment: Exam in written and oral form<br>Final assessment examination 70% (A 90%; B 80%; C 70%; D 60%; E 50%)<br>Scale of assessment (preliminary/final): Weight of the course work / exam: 30/70                                                                                                                                                                                                                                                                                                                                                                                |                                                          |
| <b>Learning outcomes:</b><br>The graduate gains basic knowledge of the cubic curve segments, spline curves, patches and spline surfaces. Spline curves and surfaces are studied with parametric or geometric continuities, the shape parameters are applied for modeling. The computational algorithms of the curve segments are presented.                                                                                                                                                                                                                                                                                                                          |                                                          |
| <b>Class syllabus:</b><br>1. Representation of cubic segments in Hermite and Bernstein basis, computational algorithms.<br>2. Geometric and parametric continuities for curve segments and creating:<br>a) interpolating splines (Hermite spline, cardinal spline, Catmull-Rom spline)<br>b) approximating splines (Bézier spline, Beta spline, B-spline).<br>Rational curves (Bézier, NURBS) and the weights as shape parameters.<br>3. Representation of surfaces defined by<br>a) geometric transformation (surfaces of revolution)<br>b) boundary curves (ruled surfaces, Coons surfaces)<br>c) control nets (tensor-product surfaces, Bézier, B-spline, NURBS). |                                                          |
| <b>Recommended literature:</b><br>Geometric Modeling with Splines / R. F. Riesenfeld, E. Cohen, G. Elber: A K Peters/CRC Press; 1 ed. 2001<br>Fundamentals of CAGD / J. Hoschek, D. Lasser: A K Peters/CRC Press; 1 ed., 1996                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                          |

Geometric Concepts for Geometric Design / W. Boehm, H. Prautzsch. Publ. by A K PETERS, 1993  
 Bézier and B-Spline Techniques / H. Prautzsch, W. Boehm, M. Paluszny. Springer-Verlag Berlin Heidelberg, 2002  
 Curves and Surfaces for CAGD, Fifth Edition: A Practical Guide / Gerald Farin. Morgan-Kaufmann, 2002

**Languages necessary to complete the course:**

english

**Notes:**

none

**Past grade distribution**

Total number of evaluated students: 26

| A     | B     | C     | D     | E    | FX   |
|-------|-------|-------|-------|------|------|
| 34,62 | 19,23 | 19,23 | 15,38 | 7,69 | 3,85 |

**Lecturers:** RNDr. Soňa Kudličková, CSc., RNDr. Martina Bátorová, PhD.

**Last change:** 25.01.2018

**Approved by:**

## COURSE DESCRIPTION

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------------------------------------------------|-------|-------|------|
| <b>Academic year:</b> 2021/2022                                                                                                                                                                   |       |                                                   |       |       |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                 |       |                                                   |       |       |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                   |       |                                                   |       |       |      |
| <b>Course ID:</b><br>FMFI.KAG/1-MAT-551/10                                                                                                                                                        |       | <b>Course title:</b><br>Geometry for Graphics (1) |       |       |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> course<br><b>Number of hours:</b><br><b>per week:</b> 4 <b>per level/semester:</b> 52<br><b>Form of the course:</b> on-site learning |       |                                                   |       |       |      |
| <b>Number of credits:</b> 5                                                                                                                                                                       |       |                                                   |       |       |      |
| <b>Recommended semester:</b> 5.                                                                                                                                                                   |       |                                                   |       |       |      |
| <b>Educational level:</b> I., II.                                                                                                                                                                 |       |                                                   |       |       |      |
| <b>Prerequisites:</b>                                                                                                                                                                             |       |                                                   |       |       |      |
| <b>Course requirements:</b>                                                                                                                                                                       |       |                                                   |       |       |      |
| <b>Learning outcomes:</b>                                                                                                                                                                         |       |                                                   |       |       |      |
| <b>Class syllabus:</b>                                                                                                                                                                            |       |                                                   |       |       |      |
| <b>Recommended literature:</b>                                                                                                                                                                    |       |                                                   |       |       |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                |       |                                                   |       |       |      |
| <b>Notes:</b>                                                                                                                                                                                     |       |                                                   |       |       |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 512                                                                                                                         |       |                                                   |       |       |      |
| A                                                                                                                                                                                                 | B     | C                                                 | D     | E     | FX   |
| 21,29                                                                                                                                                                                             | 14,84 | 18,55                                             | 19,92 | 17,77 | 7,62 |
| <b>Lecturers:</b> Mgr. Ľudovít Balko, PhD.                                                                                                                                                        |       |                                                   |       |       |      |
| <b>Last change:</b> 02.06.2015                                                                                                                                                                    |       |                                                   |       |       |      |
| <b>Approved by:</b>                                                                                                                                                                               |       |                                                   |       |       |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                   |       |                                                   |       |       |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                 |       |                                                   |       |       |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                   |       |                                                   |       |       |      |
| <b>Course ID:</b><br>FMFI.KAG/1-MAT-552/10                                                                                                                                                        |       | <b>Course title:</b><br>Geometry for Graphics (2) |       |       |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> course<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning |       |                                                   |       |       |      |
| <b>Number of credits:</b> 3                                                                                                                                                                       |       |                                                   |       |       |      |
| <b>Recommended semester:</b> 6.                                                                                                                                                                   |       |                                                   |       |       |      |
| <b>Educational level:</b> I.                                                                                                                                                                      |       |                                                   |       |       |      |
| <b>Prerequisites:</b>                                                                                                                                                                             |       |                                                   |       |       |      |
| <b>Course requirements:</b>                                                                                                                                                                       |       |                                                   |       |       |      |
| <b>Learning outcomes:</b>                                                                                                                                                                         |       |                                                   |       |       |      |
| <b>Class syllabus:</b>                                                                                                                                                                            |       |                                                   |       |       |      |
| <b>Recommended literature:</b>                                                                                                                                                                    |       |                                                   |       |       |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                |       |                                                   |       |       |      |
| <b>Notes:</b>                                                                                                                                                                                     |       |                                                   |       |       |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 304                                                                                                                         |       |                                                   |       |       |      |
| A                                                                                                                                                                                                 | B     | C                                                 | D     | E     | FX   |
| 22,7                                                                                                                                                                                              | 11,84 | 15,79                                             | 20,72 | 26,97 | 1,97 |
| <b>Lecturers:</b> Mgr. Ľudovít Balko, PhD.                                                                                                                                                        |       |                                                   |       |       |      |
| <b>Last change:</b> 02.06.2015                                                                                                                                                                    |       |                                                   |       |       |      |
| <b>Approved by:</b>                                                                                                                                                                               |       |                                                   |       |       |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                             |      |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                             |      |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                    |       |                                             |      |      |      |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-151/00                                                                                                                                                                                                                                                                                                                                                                                                         |       | <b>Course title:</b><br>German Language (1) |      |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                              |       |                                             |      |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                             |      |      |      |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                             |      |      |      |
| <b>Educational level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                             |      |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                             |      |      |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                      |       |                                             |      |      |      |
| <b>Learning outcomes:</b><br>To master the fundamentals of the common language and basic technical terms of particular fields of study (depending on the student's level of German proficiency )                                                                                                                                                                                                                                                   |       |                                             |      |      |      |
| <b>Class syllabus:</b><br>German language is taught at three levels: beginner, intermediate and advanced. Students opt for one of them depending on whether they need to learn the fundamentals or maintain and/or improve their previous knowledge.<br>This course's focus is to master the fundamentals of the common language and basic technical terms of particular fields of study (depending on the student's level of German proficiency ) |       |                                             |      |      |      |
| <b>Recommended literature:</b><br>Appropriate study material is supplied by teacher based on the participants'level of German proficiency.                                                                                                                                                                                                                                                                                                         |       |                                             |      |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                             |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                             |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 734                                                                                                                                                                                                                                                                                                                                                                          |       |                                             |      |      |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                  | B     | C                                           | D    | E    | FX   |
| 36,1                                                                                                                                                                                                                                                                                                                                                                                                                                               | 27,25 | 19,62                                       | 8,99 | 2,72 | 5,31 |
| <b>Lecturers:</b> Mgr. Alexandra Maďarová, Mgr. Simona Tomášková, PhD.                                                                                                                                                                                                                                                                                                                                                                             |       |                                             |      |      |      |
| <b>Last change:</b> 21.06.2022                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                             |      |      |      |
| <b>Approved by:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                             |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                             |       |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                             |       |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                             |       |      |      |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-152/00                                                                                                                                                                                                                                                                                                                                                                                                                             |       | <b>Course title:</b><br>German Language (2) |       |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                         |       |                                             |       |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                             |       |      |      |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                             |       |      |      |
| <b>Educational level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                             |       |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                             |       |      |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                          |       |                                             |       |      |      |
| <b>Learning outcomes:</b><br>To master the fundamentals of the common language and basic technical terms of particular fields of study (depending on the student's level of German proficiency )                                                                                                                                                                                                                                                                       |       |                                             |       |      |      |
| <b>Class syllabus:</b><br>German language is taught at two levels: beginner and intermediate. Students opt for one of them depending on whether they wish to obtain the fundamentals of the language or wish to maintain and/or improve previous knowledge of German.<br>This course's focus is to to master the fundamentals of the common language and basic technical terms of particular fields of study (depending on the student's level of German proficiency ) |       |                                             |       |      |      |
| <b>Recommended literature:</b><br>Appropriate study material is supplied by teacher based on the participants'level of German proficiency                                                                                                                                                                                                                                                                                                                              |       |                                             |       |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                             |       |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                             |       |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 480                                                                                                                                                                                                                                                                                                                                                                                              |       |                                             |       |      |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | B     | C                                           | D     | E    | FX   |
| 36,04                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 20,21 | 20,83                                       | 13,13 | 3,33 | 6,46 |
| <b>Lecturers:</b> Mgr. Alexandra Maďarová, Mgr. Simona Tomášková, PhD.                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                             |       |      |      |
| <b>Last change:</b> 21.06.2022                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                             |       |      |      |
| <b>Approved by:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                             |       |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                         |       |                                             |      |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                       |       |                                             |      |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                         |       |                                             |      |      |      |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-251/00                                                                                                                                                                                                                                                                                                              |       | <b>Course title:</b><br>German Language (3) |      |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                   |       |                                             |      |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                             |       |                                             |      |      |      |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                                         |       |                                             |      |      |      |
| <b>Educational level:</b> I., II.                                                                                                                                                                                                                                                                                                                       |       |                                             |      |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                   |       |                                             |      |      |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                           |       |                                             |      |      |      |
| <b>Learning outcomes:</b><br>Master the basics of general language and basic professional terminology of individual fields of study (depending on the advanced level of students)                                                                                                                                                                       |       |                                             |      |      |      |
| <b>Class syllabus:</b><br>The course is a follow-up to the German language (1,2). The subject provides a course of intermediate or advanced German language.<br>This course's focus is to deepen the knowledge of the common language and basic technical terms of particular fields of study (depending on the student's level of German proficiency). |       |                                             |      |      |      |
| <b>Recommended literature:</b><br>Appropriate study material is supplied by teacher based on the participants' level of German proficiency.                                                                                                                                                                                                             |       |                                             |      |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                      |       |                                             |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                           |       |                                             |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 165                                                                                                                                                                                                                                                                               |       |                                             |      |      |      |
| A                                                                                                                                                                                                                                                                                                                                                       | B     | C                                           | D    | E    | FX   |
| 41,21                                                                                                                                                                                                                                                                                                                                                   | 25,45 | 20,61                                       | 6,67 | 2,42 | 3,64 |
| <b>Lecturers:</b> Mgr. Alexandra Maďarová, Mgr. Simona Tomášková, PhD.                                                                                                                                                                                                                                                                                  |       |                                             |      |      |      |
| <b>Last change:</b> 21.06.2022                                                                                                                                                                                                                                                                                                                          |       |                                             |      |      |      |
| <b>Approved by:</b>                                                                                                                                                                                                                                                                                                                                     |       |                                             |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                 |       |                                             |       |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                               |       |                                             |       |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                 |       |                                             |       |      |      |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-252/00                                                                                                                                                                                                                                                                                                      |       | <b>Course title:</b><br>German Language (4) |       |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                           |       |                                             |       |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                     |       |                                             |       |      |      |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                                                                                 |       |                                             |       |      |      |
| <b>Educational level:</b> I., II.                                                                                                                                                                                                                                                                                                               |       |                                             |       |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                           |       |                                             |       |      |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                   |       |                                             |       |      |      |
| <b>Learning outcomes:</b><br>Master the basics of general language and basic professional terminology of individual fields of study (depending on the advanced level of students)                                                                                                                                                               |       |                                             |       |      |      |
| <b>Class syllabus:</b><br>The course is a follow-up to the German language (1-3). It provides a course of intermediate and advanced German language.<br>This course's focus is to deepen the knowledge of the common language and basic technical terms of particular fields of study (depending on the student's level of German proficiency). |       |                                             |       |      |      |
| <b>Recommended literature:</b><br>Appropriate study material is supplied by teacher based on the participants' level of German proficiency.                                                                                                                                                                                                     |       |                                             |       |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                              |       |                                             |       |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                   |       |                                             |       |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 90                                                                                                                                                                                                                                                                        |       |                                             |       |      |      |
| A                                                                                                                                                                                                                                                                                                                                               | B     | C                                           | D     | E    | FX   |
| 42,22                                                                                                                                                                                                                                                                                                                                           | 24,44 | 12,22                                       | 12,22 | 3,33 | 5,56 |
| <b>Lecturers:</b> Mgr. Alexandra Maďarová, Mgr. Simona Tomášková, PhD.                                                                                                                                                                                                                                                                          |       |                                             |       |      |      |
| <b>Last change:</b> 21.06.2022                                                                                                                                                                                                                                                                                                                  |       |                                             |       |      |      |
| <b>Approved by:</b>                                                                                                                                                                                                                                                                                                                             |       |                                             |       |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                           |      |                                      |      |      |     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                         |      |                                      |      |      |     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                           |      |                                      |      |      |     |
| <b>Course ID:</b><br>FMFI.KAG/1-MAT-460/00                                                                                                                                                                                                                                                                                                                                |      | <b>Course title:</b><br>Graph Theory |      |      |     |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                        |      |                                      |      |      |     |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                               |      |                                      |      |      |     |
| <b>Recommended semester:</b> 5.                                                                                                                                                                                                                                                                                                                                           |      |                                      |      |      |     |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                              |      |                                      |      |      |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                     |      |                                      |      |      |     |
| <b>Course requirements:</b><br>Continuous evaluation: homework (20 p.)<br>Final exam: written (80 p.)<br>Grades: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 20/80                                                                                                                                                                      |      |                                      |      |      |     |
| <b>Learning outcomes:</b><br>Understanding of an interplay of algebraic and discrete mathematical strucures, applications for solving concrete problems.                                                                                                                                                                                                                  |      |                                      |      |      |     |
| <b>Class syllabus:</b><br>The automorphism group of a graph, constructions and properties of highly symmetric graphs. Symmetry and patterns, enumeration of patterns. Independent set and cliques. Turan's theorem and extremal graphs, colorings of graphs and Ramsey's theorem. The probabilistic method, existence of a given structure, typical properties of graphs. |      |                                      |      |      |     |
| <b>Recommended literature:</b><br>J. Plesník: Grafové algoritmy, Veda, Bratislava, 1983<br>J.A. Bondy, U.S.R. Murthy: Graph Theory with Applications, North-Holland, New York - Amsterdam - London, 1976                                                                                                                                                                  |      |                                      |      |      |     |
| <b>Languages necessary to complete the course:</b><br>slovak, english                                                                                                                                                                                                                                                                                                     |      |                                      |      |      |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                             |      |                                      |      |      |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 45                                                                                                                                                                                                                                                                                                  |      |                                      |      |      |     |
| A                                                                                                                                                                                                                                                                                                                                                                         | B    | C                                    | D    | E    | FX  |
| 71,11                                                                                                                                                                                                                                                                                                                                                                     | 4,44 | 17,78                                | 4,44 | 2,22 | 0,0 |
| <b>Lecturers:</b> RNDr. Jana Tomanová, CSc.                                                                                                                                                                                                                                                                                                                               |      |                                      |      |      |     |

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| <b>Last change:</b> 19.06.2022 |
| <b>Approved by:</b>            |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                          |      |                                      |      |       |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                        |      |                                      |      |       |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                          |      |                                      |      |       |      |
| <b>Course ID:</b><br>FMFI.KAG/1-MAT-755/15                                                                                                                                                                                                                                                                                               |      | <b>Course title:</b><br>Graph Theory |      |       |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 1 <b>per level/semester:</b> 26 / 13<br><b>Form of the course:</b> on-site learning                                                                                                                 |      |                                      |      |       |      |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                              |      |                                      |      |       |      |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                          |      |                                      |      |       |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                             |      |                                      |      |       |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                    |      |                                      |      |       |      |
| <b>Antirequisites:</b> FMFI.KAGDM/1-MAT-755/00                                                                                                                                                                                                                                                                                           |      |                                      |      |       |      |
| <b>Course requirements:</b><br>Ongoing evaluation: homeworks<br>Exam: combined<br>Indicative evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 20/80                                                                                                                                       |      |                                      |      |       |      |
| <b>Learning outcomes:</b><br>Graduates will understand significant results in the field of graph theory. They will be aware of the deeper connections and relationships between different areas of graph theory.                                                                                                                         |      |                                      |      |       |      |
| <b>Class syllabus:</b><br>Basic terms and definitions, blocks, bridges and articulation, trees and spanning trees, pairings in bipartite graphs, Hall and Konig theorem, pairings in general graphs, Tutte's theorem, vertex and edge connectivity, Menger's theorem, plane graphs, Kuratowski's theorem. Linear algebra in graph theory |      |                                      |      |       |      |
| <b>Recommended literature:</b><br>Graph theory / Reinhard Diestel. Berlin : Springer, 2005                                                                                                                                                                                                                                               |      |                                      |      |       |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                       |      |                                      |      |       |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                            |      |                                      |      |       |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 106                                                                                                                                                                                                                                                                |      |                                      |      |       |      |
| A                                                                                                                                                                                                                                                                                                                                        | B    | C                                    | D    | E     | FX   |
| 57,55                                                                                                                                                                                                                                                                                                                                    | 5,66 | 11,32                                | 5,66 | 15,09 | 4,72 |
| <b>Lecturers:</b> doc. RNDr. Martin Mačaj, PhD.                                                                                                                                                                                                                                                                                          |      |                                      |      |       |      |
| <b>Last change:</b> 14.03.2022                                                                                                                                                                                                                                                                                                           |      |                                      |      |       |      |

**Approved by:**

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                             |       |                                                         |     |     |     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                           |       |                                                         |     |     |     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                             |       |                                                         |     |     |     |
| <b>Course ID:</b><br>FMFI.KMANM/1-<br>MAT-910/15                                                                                                                                                            |       | <b>Course title:</b><br>Individual Work on Final Thesis |     |     |     |
| <b>Educational activities:</b><br><b>Type of activities:</b> independent work<br><b>Number of hours:</b><br><b>per week:</b> <b>per level/semester:</b> 100s<br><b>Form of the course:</b> on-site learning |       |                                                         |     |     |     |
| <b>Number of credits:</b> 4                                                                                                                                                                                 |       |                                                         |     |     |     |
| <b>Recommended semester:</b> 5.                                                                                                                                                                             |       |                                                         |     |     |     |
| <b>Educational level:</b> I.                                                                                                                                                                                |       |                                                         |     |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                       |       |                                                         |     |     |     |
| <b>Course requirements:</b>                                                                                                                                                                                 |       |                                                         |     |     |     |
| <b>Learning outcomes:</b>                                                                                                                                                                                   |       |                                                         |     |     |     |
| <b>Class syllabus:</b>                                                                                                                                                                                      |       |                                                         |     |     |     |
| <b>Recommended literature:</b>                                                                                                                                                                              |       |                                                         |     |     |     |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                          |       |                                                         |     |     |     |
| <b>Notes:</b>                                                                                                                                                                                               |       |                                                         |     |     |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 77                                                                                                                                    |       |                                                         |     |     |     |
| A                                                                                                                                                                                                           | B     | C                                                       | D   | E   | FX  |
| 70,13                                                                                                                                                                                                       | 11,69 | 11,69                                                   | 0,0 | 2,6 | 3,9 |
| <b>Lecturers:</b> prof. RNDr. Ján Filo, CSc.                                                                                                                                                                |       |                                                         |     |     |     |
| <b>Last change:</b> 02.06.2015                                                                                                                                                                              |       |                                                         |     |     |     |
| <b>Approved by:</b>                                                                                                                                                                                         |       |                                                         |     |     |     |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                   |       |                                                                          |     |     |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                 |       |                                                                          |     |     |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                   |       |                                                                          |     |     |      |
| <b>Course ID:</b><br>FMFI.KAI/1-MXX-491/15                                                                                                                                                        |       | <b>Course title:</b><br>Integrated Education of People with Disabilities |     |     |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> course<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning |       |                                                                          |     |     |      |
| <b>Number of credits:</b> 3                                                                                                                                                                       |       |                                                                          |     |     |      |
| <b>Recommended semester:</b> 1.                                                                                                                                                                   |       |                                                                          |     |     |      |
| <b>Educational level:</b> I.                                                                                                                                                                      |       |                                                                          |     |     |      |
| <b>Prerequisites:</b>                                                                                                                                                                             |       |                                                                          |     |     |      |
| <b>Course requirements:</b>                                                                                                                                                                       |       |                                                                          |     |     |      |
| <b>Learning outcomes:</b>                                                                                                                                                                         |       |                                                                          |     |     |      |
| <b>Class syllabus:</b>                                                                                                                                                                            |       |                                                                          |     |     |      |
| <b>Recommended literature:</b>                                                                                                                                                                    |       |                                                                          |     |     |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                |       |                                                                          |     |     |      |
| <b>Notes:</b>                                                                                                                                                                                     |       |                                                                          |     |     |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 55                                                                                                                          |       |                                                                          |     |     |      |
| A                                                                                                                                                                                                 | B     | C                                                                        | D   | E   | FX   |
| 78,18                                                                                                                                                                                             | 18,18 | 1,82                                                                     | 0,0 | 0,0 | 1,82 |
| <b>Lecturers:</b> PaedDr. Elena Mendelová, CSc.                                                                                                                                                   |       |                                                                          |     |     |      |
| <b>Last change:</b> 02.06.2015                                                                                                                                                                    |       |                                                                          |     |     |      |
| <b>Approved by:</b>                                                                                                                                                                               |       |                                                                          |     |     |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                       |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                       |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                       |
| <b>Course ID:</b><br>FMFI.KAG/1-MAT-495/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Course title:</b><br>Introduction to Coding Theory |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                             |                                                       |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                       |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                       |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                       |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                       |
| <b>Recommended prerequisites:</b><br>1-MAT-260 Algebra (2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                       |
| <b>Course requirements:</b><br>Ongoing evaluation during the semester: homeworks, midterm<br>Final exam: written and oral<br>Approximative grade scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 50/50                                                                                                                                                                                                                                                                                                                    |                                                       |
| <b>Learning outcomes:</b><br>After completing the course, students will understand fundamental theoretical and practical aspects of coding theory, data transmission in a noisy channel as well as the basic principles of protecting data against errors introduced in transmission or storage.                                                                                                                                                                                                                                                               |                                                       |
| <b>Class syllabus:</b><br>Introduction to Coding Theory and Cryptography. Coding theory for the "ideal" communication channel (definitions and examples, concepts of encoding and decoding, construction of some simple codes, the shortest code, block codes etc.) Introduction to the theory of error-correcting codes (the minimum distance of a nontrivial code, detection and correction of transmitted errors, information symbols and parity check symbols).<br>Introduction to the theory of linear codes. (generator matrix and parity check matrix). |                                                       |
| <b>Recommended literature:</b><br>Introduction to coding theory / Jacobus Hendricus van Lint. Berlin : Springer, 1999<br>J. Adámek: Coding theory, SNTL, Praha 1989 (in Czech)<br>Paul Garrett, The Mathematics of Coding Theory, Pearson Prentice Hall<br>Raymond Hill, A First Course in Coding Theory, Oxford<br>Steven Roman, Coding and Information Theory, Springer                                                                                                                                                                                      |                                                       |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                       |

|                                                   |      |      |      |      |      |
|---------------------------------------------------|------|------|------|------|------|
| <b>Past grade distribution</b>                    |      |      |      |      |      |
| Total number of evaluated students: 73            |      |      |      |      |      |
| A                                                 | B    | C    | D    | E    | FX   |
| 83,56                                             | 5,48 | 4,11 | 1,37 | 1,37 | 4,11 |
| <b>Lecturers:</b> doc. RNDr. Róbert Jajcay, DrSc. |      |      |      |      |      |
| <b>Last change:</b> 14.03.2022                    |      |      |      |      |      |
| <b>Approved by:</b>                               |      |      |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                           |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                           |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                           |
| <b>Course ID:</b><br>FMFI.KAG/1-MAT-180/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Course title:</b><br>Introduction to Computer Graphics |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                          |                                                           |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                           |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                           |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                           |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                           |
| <b>Recommended prerequisites:</b><br>None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                           |
| <b>Course requirements:</b><br>For the semester, the student can get 50% for exercises, 20% for midterm and the final written exam has a weight of 30%. The student must obtain at least half of the points for the exercises as well as for the project in order to pass the final written exam. Grading: A (100-91), B (90-81), C (80-71), D (70-61), E (60-51), Fx (50-0).<br>Scale of assessment (preliminary/final): Weight of midterm / final assessment: Mid-term assessment 20% (midterm) / + 50% project 30% final exam. |                                                           |
| <b>Learning outcomes:</b><br>Students will gain knowledge about algorithmic solutions to basic computer graphics problems. They will learn the methodology of working on the creation of a graphics system and the use of algorithms in terms of efficiency, time and memory requirements. They will acquire knowledge and skills in modeling and displaying graphic objects and static scenes.                                                                                                                                   |                                                           |
| <b>Class syllabus:</b><br>Computer graphics definition and reference model. History, fundamental problems and their solutions. Transformations in the plane. Basics of functional specification of graphic systems and standards. Graphical objects creation, modification, and coding. Rasterisation. Clipping and intersections. Fundamental image processing algorithms.                                                                                                                                                       |                                                           |
| <b>Recommended literature:</b><br>Ružický, E. a kol. Počítačová grafika a spracovanie obrazu. Bratislava: Sapientia 1995.<br>Počítačová grafika a spracovanie obrazu / Eugen Ružický, Andrej Ferko. Bratislava : Sapientia, 1995<br>Moderní počítačová grafika / Jiří Žára, Bedřich Beneš, Petr Felkel. Praha : Computer Press, 1998<br>Fundamentals of interactive computer graphics / James D. Foley, Andries van Dam. Reading : Addison-Wesley, 1983<br>Supporting digital texts available from the class website.             |                                                           |

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| <b>Languages necessary to complete the course:</b><br>English, Slovak     |       |       |      |      |      |
| <b>Notes:</b><br>The class is eventually taught in a distant mode.        |       |       |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 757 |       |       |      |      |      |
| A                                                                         | B     | C     | D    | E    | FX   |
| 33,55                                                                     | 31,44 | 16,51 | 7,93 | 3,04 | 7,53 |
| <b>Lecturers:</b> doc. RNDr. Andrej Ferko, PhD., Mgr. Adriana Bosáková    |       |       |      |      |      |
| <b>Last change:</b> 22.06.2022                                            |       |       |      |      |      |
| <b>Approved by:</b>                                                       |       |       |      |      |      |

## COURSE DESCRIPTION

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------------------------------|-------|------|------|
| <b>Academic year:</b> 2021/2022                                                                                                                                                                   |       |                                                |       |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                 |       |                                                |       |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                   |       |                                                |       |      |      |
| <b>Course ID:</b><br>FMFI.KAI/1-AIN-406/15                                                                                                                                                        |       | <b>Course title:</b><br>Language and Cognition |       |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> course<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning |       |                                                |       |      |      |
| <b>Number of credits:</b> 3                                                                                                                                                                       |       |                                                |       |      |      |
| <b>Recommended semester:</b> 2., 4., 6.                                                                                                                                                           |       |                                                |       |      |      |
| <b>Educational level:</b> I.                                                                                                                                                                      |       |                                                |       |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                             |       |                                                |       |      |      |
| <b>Course requirements:</b>                                                                                                                                                                       |       |                                                |       |      |      |
| <b>Learning outcomes:</b>                                                                                                                                                                         |       |                                                |       |      |      |
| <b>Class syllabus:</b>                                                                                                                                                                            |       |                                                |       |      |      |
| <b>Recommended literature:</b>                                                                                                                                                                    |       |                                                |       |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                |       |                                                |       |      |      |
| <b>Notes:</b>                                                                                                                                                                                     |       |                                                |       |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 111                                                                                                                         |       |                                                |       |      |      |
| A                                                                                                                                                                                                 | B     | C                                              | D     | E    | FX   |
| 31,53                                                                                                                                                                                             | 25,23 | 17,12                                          | 12,61 | 6,31 | 7,21 |
| <b>Lecturers:</b> doc. PhDr. Ján Rybár, PhD.                                                                                                                                                      |       |                                                |       |      |      |
| <b>Last change:</b> 12.01.2022                                                                                                                                                                    |       |                                                |       |      |      |
| <b>Approved by:</b>                                                                                                                                                                               |       |                                                |       |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                         |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                    |                                                         |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                      |                                                         |
| <b>Course ID:</b><br>FMFI.KAG/1-MAT-120/15                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Course title:</b><br>Linear Algebra and Geometry (1) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 / 2 <b>per level/semester:</b> 52 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                             |                                                         |
| <b>Number of credits:</b> 8                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                         |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                         |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                         |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                         |
| <b>Course requirements:</b><br>Continuous assessment: 2 tests and 2 presentations at tutorials (together 30% of the overall mark), the student has to have at least mark E to be admitted to the exam<br>Exam: a test and an oral exam (35% and 35% of overall mark)<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 30/70                                                             |                                                         |
| <b>Learning outcomes:</b><br>Students will acquire practical skills in solving and in qualitative analysis of systems of linear equations; they will master the basics of the theory of vector spaces and linear maps.<br>Students will improve in proving mathematical statements and deriving properties of mathematical objects, they will advance in the ability to argue in the language and style of university mathematics.                   |                                                         |
| <b>Class syllabus:</b><br>Number systems. Functions. Groups, rings and fields. Vector spaces. Gaussian elimination method for solving systems of linear equations. Matrices and linear maps. Solvability of a system of linear equations and the structure of the set of its solutions. Determinants and their use. Euclidean vector spaces. Orthogonal projection onto a subspace of a Euclidean vector space.                                      |                                                         |
| <b>Recommended literature:</b><br>Prednášky z lineárnej algebry a geometrie / Július Korbaš, Štefan Gyurki. Vydavateľstvo UK, Bratislava, 2013<br>Lineárna algebra a geometria : Cesta z troch rozmerov s presahmi do príbuzných odborov / Pavol Zlatoš. Bratislava : Albert Marenčin, 2011; electronic version available at <a href="http://thales.doa.fmph.uniba.sk/zlatos/la/LAG_A4.pdf">http://thales.doa.fmph.uniba.sk/zlatos/la/LAG_A4.pdf</a> |                                                         |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                |                                                         |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                         |

|                                                                  |       |       |      |       |       |
|------------------------------------------------------------------|-------|-------|------|-------|-------|
| <b>Past grade distribution</b>                                   |       |       |      |       |       |
| Total number of evaluated students: 165                          |       |       |      |       |       |
| A                                                                | B     | C     | D    | E     | FX    |
| 15,76                                                            | 14,55 | 15,76 | 20,0 | 21,82 | 12,12 |
| <b>Lecturers:</b> doc. Mgr. Tibor Macko, PhD., Mgr. Dávid Wilsch |       |       |      |       |       |
| <b>Last change:</b> 21.06.2022                                   |       |       |      |       |       |
| <b>Approved by:</b>                                              |       |       |      |       |       |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                         |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                         |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                         |
| <b>Course ID:</b><br>FMFI.KAG/1-MAT-160/15                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Course title:</b><br>Linear Algebra and Geometry (2) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 / 2 <b>per level/semester:</b> 52 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                       |                                                         |
| <b>Number of credits:</b> 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                         |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                         |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                         |
| <b>Prerequisites:</b> FMFI.KAG/1-MAT-120/15 - Linear Algebra and Geometry (1)                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                         |
| <b>Course requirements:</b><br>Continuous assessment: 2 tests and 2 presentations at tutorials (together 30% of the overall mark), the student has to have at least mark E to be admitted to the exam<br>Exam: a test and an oral exam (35% and 35% of overall mark)<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 30/70                                                                                                                       |                                                         |
| <b>Learning outcomes:</b><br>Students will learn the basics of affine geometry, respectively affine-euclidean spaces, deepen and expand knowledge about linear maps (transformations), master the basics of the theory of quadratic forms and their geometric applications and the basics of multilinear algebra.<br>Students will improve in proving mathematical statements and deriving properties of mathematical objects, they will be able to argue in the language and style of university mathematics. |                                                         |
| <b>Class syllabus:</b><br>Affine spaces and affine subspaces (linear varieties); orientation. Affine-Euclidean space. Vector product and triple product of vectors; applications. Linear transformations. Eigenvalues and eigenvectors. Bilinear and quadratic forms. Second order curves; applications of the theory of quadratic forms. Dual vector space. Tensor product of vector spaces.                                                                                                                  |                                                         |
| <b>Recommended literature:</b><br>Prednášky z lineárnej algebry a geometrie / Július Korbaš, Štefan Gyurki. Vydavateľstvo UK, Bratislava, 2013<br>Lineárna algebra a geometria : Cesta z troch rozmerov s presahmi do príbuzných odborov / Pavol Zlatoš. Bratislava : Albert Marenčin, 2011; elektronická verzia dostupná na <a href="http://thales.doa.fmph.uniba.sk/zlatos/la/LAG_A4.pdf">http://thales.doa.fmph.uniba.sk/zlatos/la/LAG_A4.pdf</a>                                                           |                                                         |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                         |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                         |

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|----------------------------------------------------------------------------------------------|-------|-------|-------|-------|------|
| <b>Past grade distribution</b>                                                               |       |       |       |       |      |
| Total number of evaluated students: 140                                                      |       |       |       |       |      |
| A                                                                                            | B     | C     | D     | E     | FX   |
| 22,14                                                                                        | 17,86 | 12,14 | 23,57 | 16,43 | 7,86 |
| <b>Lecturers:</b> RNDr. Martin Sleziak, PhD., doc. Mgr. Tibor Macko, PhD., Mgr. Dávid Wilsch |       |       |       |       |      |
| <b>Last change:</b> 21.06.2022                                                               |       |       |       |       |      |
| <b>Approved by:</b>                                                                          |       |       |       |       |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                 |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                 |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                 |
| <b>Course ID:</b><br>FMFI.KAG/1-MAT-191/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Course title:</b><br>Linear Algebra and Geometry Classes (1) |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                 |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                 |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                 |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                 |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                 |
| <b>Course requirements:</b><br>Homework assignments<br>Grading: A 90%, B 80%, C 70%, D 60%, E 50%, Fx < 50%<br>Scale of assessment (preliminary/final): Semester 100% (homework assignments)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                 |
| <b>Learning outcomes:</b><br>The students will acquire practical skills in various computations related to the topics of the course Linear Algebra and Geometry (1).<br>Discussion of problems will improve their ability to analyze problems and build coherent arguments. The students will gain better insight into why various algorithms lead to the desired results. They will also understand the limitations of these algorithms.                                                                                                                                                                                                                                                                                           |                                                                 |
| <b>Class syllabus:</b><br>Topics corresponding to the individual interests of students, within the following framework: Number systems (integers, rational numbers, real numbers, complex numbers), mappings, groups, rings, fields, vector spaces, the Gaussian elimination method for solving systems of linear equations, matrices and linear mappings, solvability of a system of linear equations and structure of the solution set, determinants and their applications, Euclidean vector spaces, orthogonal projection to a subspace.                                                                                                                                                                                        |                                                                 |
| <b>Recommended literature:</b><br>J. Korbaš: Lineárna algebra a geometria I. Univerzita Komenského, Bratislava 2003.<br>T. Katriňák, M. Gavalec, E. Gedeonová, J. Smítal: Algebra a teoretická aritmetika 1. Univerzita Komenského, Bratislava 1999.<br>G. Birkhoff, S. MacLane: Prehľad modernej algebry. Alfa, Bratislava 1979.<br>P. Kaprálik, J. Tvarožek: Zbierka riešených príkladov a úloh z lineárnej algebry a analytickej geometrie. ALFA, Bratislava 1987.<br>A. K. Faddejev, J. S. Sominskij: Zbierka úloh z vyššej algebry. Alfa, Bratislava 1968.<br>A. I. Kostrikin, Yu. I. Manin: Linear Algebra and Geometry. Gordon & Breach, New York 1989.<br>I. V. Proskurjakov: Problems in Linear Algebra. Mir, Moscow 1978. |                                                                 |

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| <b>Languages necessary to complete the course:</b>                        |      |       |       |       |      |
| <b>Notes:</b>                                                             |      |       |       |       |      |
| <b>Past grade distribution</b>                                            |      |       |       |       |      |
| Total number of evaluated students: 554                                   |      |       |       |       |      |
| A                                                                         | B    | C     | D     | E     | FX   |
| 27,98                                                                     | 20,4 | 18,95 | 16,97 | 11,19 | 4,51 |
| <b>Lecturers:</b> RNDr. Martin Sleziak, PhD., doc. Mgr. Tibor Macko, PhD. |      |       |       |       |      |
| <b>Last change:</b> 18.06.2022                                            |      |       |       |       |      |
| <b>Approved by:</b>                                                       |      |       |       |       |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                 |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                 |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                 |
| <b>Course ID:</b><br>FMFI.KAG/1-MAT-192/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Course title:</b><br>Linear Algebra and Geometry Classes (2) |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                 |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                 |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                 |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                 |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                 |
| <b>Course requirements:</b><br>Homework assignments<br>Grading: A 90%, B 80%, C 70%, D 60%, E 50%, Fx < 50%<br>Scale of assessment (preliminary/final): Semester 100% (homework assignments)                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                 |
| <b>Learning outcomes:</b><br>The students will acquire practical skills in various computations related to the topics of the course Linear Algebra and Geometry (2).<br>Discussion of problems will improve their ability to analyze problems and build coherent arguments. The students will be able to apply the standard computational algorithms and they will improve their geometric intuition.                                                                                                                                                                                                                  |                                                                 |
| <b>Class syllabus:</b><br>Topics corresponding to the individual interests of students, within the following framework: Affine spaces and subspaces. Orientation. Affine spaces with an inner product. Vector product and mixed product and their applications. Selected facts on polynomials. Linear transformations (eigenvalues, eigenvectors, diagonalization, Jordan normal form). Bilinear and quadratic forms. Plane curves of the second order; applications of the theory of quadratic forms. Dual vector spaces. Multilinear forms. Tensors.                                                                 |                                                                 |
| <b>Recommended literature:</b><br>M. Hejný, V. Zaťko, P. Kršňák: Geometria 1. SPN, Bratislava 1985.<br>T. Katriňák, M. Gavalec, E. Gedeonová, J. Smítal: Algebra a teoretická aritmetika 1. Univerzita Komenského, Bratislava 1999.<br>P. Kaprálik, J. Tvarožek: Zbierka riešených príkladov a úloh z lineárnej algebry a analytickej geometrie. ALFA, Bratislava 1987.<br>A. I. Kostrikin, Yu.I.Manin: Linear Algebra and Geometry. Gordon & Breach, New York 1989.<br>G. Birkhoff, S. MacLane: Prehľad modernej algebry. Alfa, Bratislava 1979.<br>I. V. Proskurjakov: Problems in Linear Algebra. Mir, Moscow 1978. |                                                                 |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                 |

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|---------------------------------------------------------------------------|-------|------|-------|------|------|
| <b>Notes:</b>                                                             |       |      |       |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 485 |       |      |       |      |      |
| A                                                                         | B     | C    | D     | E    | FX   |
| 30,93                                                                     | 18,76 | 16,7 | 16,08 | 13,4 | 4,12 |
| <b>Lecturers:</b> RNDr. Martin Sleziak, PhD., doc. Mgr. Tibor Macko, PhD. |       |      |       |      |      |
| <b>Last change:</b> 21.06.2022                                            |       |      |       |      |      |
| <b>Approved by:</b>                                                       |       |      |       |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                            |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                            |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                            |
| <b>Course ID:</b><br>FMFI.KMANM/1-MAT-466/10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Course title:</b><br>Linear Programming |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                           |                                            |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |
| <b>Recommended semester:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                            |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                            |
| <b>Prerequisites:</b> FMFI.KAG/1-MAT-160/15 - Linear Algebra and Geometry (2) and FMFI.KMANM/1-MAT-150/00 - Mathematical Analysis (2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                            |
| <b>Course requirements:</b><br>Continuous assessment: exercises: 30%, project: 20%, Exam: 50%.<br>The student must obtain at least half of the points for the exercises in order to pass the final written exam.<br>Grading: A (100-91), B (90-81), C (80-71), D (70-61), E (60-51), Fx (50-0).<br>Scale of assessment (preliminary/final): 50/50                                                                                                                                                                                                                                                                  |                                            |
| <b>Learning outcomes:</b><br>Students master the basics of linear programming (simple models of real problems, relevant geometry, duality theory and some simplex methods, the idea of interior point methods). They are able to prove the statements. At the same time, they will gain an overview of possible applications of linear programming in other scientific fields, or in practice.                                                                                                                                                                                                                     |                                            |
| <b>Class syllabus:</b><br>Geometric approach to solving linear programming problems. Practical problems formulation in the form of LP. Fundamentals of convex analysis (convex set, polyhedrons, extreme points, separation theorems, theorems of alternatives). Basic solutions and connection with extreme points. Simplex method (basic idea, two-phase and dual simplex method). Duality theory (duality and complementarity theorems) and its applications and economic interpretation. basic idea of interior point methods for linear programming, central path. Modern applications of linear programming. |                                            |
| <b>Recommended literature:</b><br>Mária Trnovská: Lineárne programovanie, online text.<br>Lineárne programovanie / Ján Plesník, Jitka Dupačová, Milan Vlach. Bratislava : Alfa, 1990<br>Robert J. Vanderbei: Linear programming: Foundations and extensions, Kluwer Academic Publishers, 2000.                                                                                                                                                                                                                                                                                                                     |                                            |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                            |

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|---------------------------------------------------|-------|-------|-------|------|-----|
| <b>Notes:</b>                                     |       |       |       |      |     |
| <b>Past grade distribution</b>                    |       |       |       |      |     |
| Total number of evaluated students: 74            |       |       |       |      |     |
| A                                                 | B     | C     | D     | E    | FX  |
| 35,14                                             | 13,51 | 27,03 | 12,16 | 9,46 | 2,7 |
| <b>Lecturers:</b> doc. RNDr. Mária Trnovská, PhD. |       |       |       |      |     |
| <b>Last change:</b> 16.06.2022                    |       |       |       |      |     |
| <b>Approved by:</b>                               |       |       |       |      |     |

## COURSE DESCRIPTION

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                   |
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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                   |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                   |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                   |
| <b>Course ID:</b><br>FMFI.KMANM/1-<br>MAT-110/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Course title:</b><br>Mathematical Analysis (1) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 / 2 <b>per level/semester:</b> 52 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                   |
| <b>Number of credits:</b> 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                   |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                   |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                   |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                   |
| <b>Course requirements:</b><br>For the semester, the student can get 15 points for exercises, 40 points for written exams, the final written exam has a weight of 30 points, the final oral exam weighs 15 points. The student must obtain at least 45 points from the exercises, written exams and the final written exam, at least 15 points from the final written exam and at least 5 points from the final oral exam. Grading: A (91-100 points), B (81-90 points), C (71-80 points), D (61-70 points), E (51-60 points), Fx (0-50 points). Weight of the ongoing / final assessment: ongoing assessment 55% (15% exercise + 40% written exams) / 45% (30% final written exam, 15% final oral exam). Scale of assessment (preliminary/final): 55/45 |                                                   |
| <b>Learning outcomes:</b><br>After completing the course, the student can use the apparatus of differential calculus of functions of one real variable in solving appropriate problems of theoretical and practical focus.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                   |
| <b>Class syllabus:</b><br>Real numbers, functions of real variables. Limit of the function, basic theorems on limits. Compact sets. Continuity of a function in a point and on a set, basic properties of continuous functions on intervals and compact sets. Derivative and general rules for differentiation. Repeated differentiation. Mean value theorems. Applications of the derivative. L'Hospital's rule. Taylor's polynomials.                                                                                                                                                                                                                                                                                                                  |                                                   |
| <b>Recommended literature:</b><br>Rudin, Walter: Principles of mathematical analysis, ISBN 0-07-054235-X<br>Hildebrandt, Stefan: Analysis I, ISBN 3-540-42838-0<br>Forstter, Otto: Analysis I, ISBN 3-528-57224-8<br>Neubrunn, Tibor a Vencko, Jozef: Mathematical Analysis I, textbook of FMFI UK<br>Kubáček, Valášek: Cvičenia z Matematickej analýzy 1,2                                                                                                                                                                                                                                                                                                                                                                                              |                                                   |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                   |

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|-----------------------------------------------------------------------------|-------|-------|-------|-------|------|
| <b>Notes:</b>                                                               |       |       |       |       |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 793   |       |       |       |       |      |
| A                                                                           | B     | C     | D     | E     | FX   |
| 10,09                                                                       | 10,47 | 13,11 | 27,11 | 32,28 | 6,94 |
| <b>Lecturers:</b> doc. RNDr. Zbyněk Kubáček, CSc., Mgr. Július Pačuta, PhD. |       |       |       |       |      |
| <b>Last change:</b> 24.06.2022                                              |       |       |       |       |      |
| <b>Approved by:</b>                                                         |       |       |       |       |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                   |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                   |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                   |
| <b>Course ID:</b><br>FMFI.KMANM/1-<br>MAT-150/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Course title:</b><br>Mathematical Analysis (2) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 / 2 <b>per level/semester:</b> 52 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                   |
| <b>Number of credits:</b> 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                   |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                   |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                   |
| <b>Prerequisites:</b> FMFI.KMANM/1-MAT-110/00 - Mathematical Analysis (1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                   |
| <b>Course requirements:</b><br>For the semester, the student can get 15 points for exercises, 40 points for written exams, the final written exam has a weight of 30 points, the final oral exam weighs 15 points. The student must obtain at least 45 points from the exercises, written exams and the final written exam, at least 15 points from the final written exam and at least 5 points from the final oral exam. Grading: A (91-100 points), B (81-90 points), C (71-80 points), D (61-70 points), E (51-60 points), Fx (0-50 points). Weight of the ongoing / final assessment: ongoing assessment 55% (15% exercise + 40% written exams) / 45% (30% final written exam, 15% final oral exam). Scale of assessment (preliminary/final): 55/45 |                                                   |
| <b>Learning outcomes:</b><br>After completing the course, students will be able to use the apparatus of integral calculus of functions of one real variable, series and series of functions to solve appropriate computational and theoretical problems.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                   |
| <b>Class syllabus:</b><br>Antiderivatives and indefinite integrals and techniques of integration. The definite integral and its properties. Integral as a limit of integral sums. Derivatives with variable endpoints. The fundamental theorem. Mean value theorems. Applications of the integral. Series of positive terms. Absolutely and conditionally convergent series. Series of functions. Pointwise and uniform convergence. Power series. Taylor series.                                                                                                                                                                                                                                                                                        |                                                   |
| <b>Recommended literature:</b><br>Rudin, Walter: Principles of mathematical analysis, ISBN 0-07-054235-X<br>Hildebrandt, Stefan: Analysis I, ISBN 3-540-42838-0<br>Forstter, Otto: Analysis I, ISBN 3-528-57224-8<br>Neubrunn, Tibor a Vencko, Jozef: Mathematical Analysis I, textbook of FMFI UK<br>Kubáček, Valášek: Cvičenia z Matematickej analýzy 1,2, textbook of FMFI UK                                                                                                                                                                                                                                                                                                                                                                         |                                                   |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                   |

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|------------------------------------------------------------------------|-------|-------|-------|------|------|
| <b>Notes:</b>                                                          |       |       |       |      |      |
| <b>Past grade distribution</b>                                         |       |       |       |      |      |
| Total number of evaluated students: 711                                |       |       |       |      |      |
| A                                                                      | B     | C     | D     | E    | FX   |
| 12,94                                                                  | 10,41 | 17,02 | 27,43 | 30,8 | 1,41 |
| <b>Lecturers:</b> doc. RNDr. Zbyněk Kubáček, CSc., Mgr. Ivana Eliašová |       |       |       |      |      |
| <b>Last change:</b> 24.06.2022                                         |       |       |       |      |      |
| <b>Approved by:</b>                                                    |       |       |       |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                 |     |                                                   |       |       |       |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                               |     |                                                   |       |       |       |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                 |     |                                                   |       |       |       |
| <b>Course ID:</b><br>FMFI.KMANM/1-MAT-210/00                                                                                                                                                                                                                                                                                                                                                    |     | <b>Course title:</b><br>Mathematical Analysis (3) |       |       |       |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 / 2 <b>per level/semester:</b> 52 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                        |     |                                                   |       |       |       |
| <b>Number of credits:</b> 8                                                                                                                                                                                                                                                                                                                                                                     |     |                                                   |       |       |       |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                                                                                 |     |                                                   |       |       |       |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                    |     |                                                   |       |       |       |
| <b>Prerequisites:</b> FMFI.KMANM/1-MAT-150/00 - Mathematical Analysis (2) and FMFI.KAG/1-MAT-160/15 - Linear Algebra and Geometry (2)                                                                                                                                                                                                                                                           |     |                                                   |       |       |       |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 40/60                                                                                                                                                                                                                                                                                                                   |     |                                                   |       |       |       |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                                                                                                                       |     |                                                   |       |       |       |
| <b>Class syllabus:</b><br>Metric spaces. Limits and continuity of functions of several variables. Differentiability, directional and partial derivatives. Local and global extrema of functions of several variables, constrained extrema. The implicit function theorem. Parametric integrals.                                                                                                 |     |                                                   |       |       |       |
| <b>Recommended literature:</b><br>M.Gera, V.Ďurikovič: Matematická analýza 1, Alfa, Bratislava 1990.<br>W.Fleming: Functions of Several Variables, Springer-Verlag, New York-Heidelberg-Berlin 1997.<br>M.Barnovská a kol.: Cvičenia z matematickej analýzy III (skriptá MFF UK), Bratislava 1993.<br>B.P.Demidovič: Sbornik zadač i upražnenij po matematičeskomu analyzu, Nauka, Moskva 1977. |     |                                                   |       |       |       |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                              |     |                                                   |       |       |       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                   |     |                                                   |       |       |       |
| <b>Past grade distribution</b><br>Total number of evaluated students: 483                                                                                                                                                                                                                                                                                                                       |     |                                                   |       |       |       |
| A                                                                                                                                                                                                                                                                                                                                                                                               | B   | C                                                 | D     | E     | FX    |
| 10,97                                                                                                                                                                                                                                                                                                                                                                                           | 8,9 | 12,22                                             | 19,88 | 28,99 | 19,05 |
| <b>Lecturers:</b> prof. RNDr. Ján Filo, CSc., RNDr. Kristína Rostás, PhD., doc. RNDr. Zbyněk Kubáček, CSc.                                                                                                                                                                                                                                                                                      |     |                                                   |       |       |       |
| <b>Last change:</b> 02.06.2015                                                                                                                                                                                                                                                                                                                                                                  |     |                                                   |       |       |       |
| <b>Approved by:</b>                                                                                                                                                                                                                                                                                                                                                                             |     |                                                   |       |       |       |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                          |      |                                                   |       |       |       |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                        |      |                                                   |       |       |       |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                          |      |                                                   |       |       |       |
| <b>Course ID:</b><br>FMFI.KMANM/1-MAT-250/14                                                                                                                                                                             |      | <b>Course title:</b><br>Mathematical Analysis (4) |       |       |       |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 4 / 2 <b>per level/semester:</b> 52 / 26<br><b>Form of the course:</b> on-site learning |      |                                                   |       |       |       |
| <b>Number of credits:</b> 8                                                                                                                                                                                              |      |                                                   |       |       |       |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                          |      |                                                   |       |       |       |
| <b>Educational level:</b> I.                                                                                                                                                                                             |      |                                                   |       |       |       |
| <b>Prerequisites:</b> FMFI.KAG/1-MAT-160/15 - Linear Algebra and Geometry (2) and FMFI.KMANM/1-MAT-150/00 - Mathematical Analysis (2)                                                                                    |      |                                                   |       |       |       |
| <b>Course requirements:</b>                                                                                                                                                                                              |      |                                                   |       |       |       |
| <b>Learning outcomes:</b>                                                                                                                                                                                                |      |                                                   |       |       |       |
| <b>Class syllabus:</b>                                                                                                                                                                                                   |      |                                                   |       |       |       |
| <b>Recommended literature:</b>                                                                                                                                                                                           |      |                                                   |       |       |       |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                       |      |                                                   |       |       |       |
| <b>Notes:</b>                                                                                                                                                                                                            |      |                                                   |       |       |       |
| <b>Past grade distribution</b><br>Total number of evaluated students: 105                                                                                                                                                |      |                                                   |       |       |       |
| A                                                                                                                                                                                                                        | B    | C                                                 | D     | E     | FX    |
| 8,57                                                                                                                                                                                                                     | 7,62 | 9,52                                              | 22,86 | 20,95 | 30,48 |
| <b>Lecturers:</b> RNDr. Michal Pospíšil, PhD., prof. RNDr. Ján Filo, CSc., RNDr. Kristína Rostás, PhD.                                                                                                                   |      |                                                   |       |       |       |
| <b>Last change:</b> 02.06.2015                                                                                                                                                                                           |      |                                                   |       |       |       |
| <b>Approved by:</b>                                                                                                                                                                                                      |      |                                                   |       |       |       |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                                           |       |       |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                       |       |                                                           |       |       |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                         |       |                                                           |       |       |      |
| <b>Course ID:</b><br>FMFI.KMANM/1-<br>MAT-710/00                                                                                                                                                                                                                                                                                                                                                                                        |       | <b>Course title:</b><br>Mathematical Analysis Classes (1) |       |       |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                   |       |                                                           |       |       |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                                           |       |       |      |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                                           |       |       |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                                           |       |       |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                           |       |       |      |
| <b>Course requirements:</b><br>Continuous assessment: solving tasks at the board, elaboration of controlled homework, assessment from compulsory exercise<br>Indicative rating scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                               |       |                                                           |       |       |      |
| <b>Learning outcomes:</b><br>After completing the course, students will be able to calculate problems in the field of differential calculus of a real function of one real variable.                                                                                                                                                                                                                                                    |       |                                                           |       |       |      |
| <b>Class syllabus:</b><br>Real numbers, functions of real variables. Limit of the function, basic theorems on limits. Compact sets. Continuity of a function in a point and on a set, basic properties of continuous functions on intervals and compact sets. Derivative and general rules for differentiation. Repeated differentiation. Mean value theorems. Applications of the derivative. L'Hospital's rule. Taylor's polynomials. |       |                                                           |       |       |      |
| <b>Recommended literature:</b><br>Cvičenia z matematickej analýzy I / Zbyněk Kubáček, Ján Valášek. Bratislava : Univerzita Komenského, 2009                                                                                                                                                                                                                                                                                             |       |                                                           |       |       |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                   |       |                                                           |       |       |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                                           |       |       |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 646                                                                                                                                                                                                                                                                                                                                                               |       |                                                           |       |       |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                       | B     | C                                                         | D     | E     | FX   |
| 39,78                                                                                                                                                                                                                                                                                                                                                                                                                                   | 15,63 | 12,54                                                     | 12,38 | 11,15 | 8,51 |
| <b>Lecturers:</b> RNDr. Kristína Rostás, PhD., Mgr. Július Pačuta, PhD., Mgr. Michaela Vargová, PhD.                                                                                                                                                                                                                                                                                                                                    |       |                                                           |       |       |      |

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| <b>Last change:</b> 24.06.2022 |
| <b>Approved by:</b>            |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                           |      |       |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                                           |      |       |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                           |      |       |      |
| <b>Course ID:</b><br>FMFI.KMANM/1-MAT-720/00                                                                                                                                                                                                                                                                                                                                                                                                                      |       | <b>Course title:</b><br>Mathematical Analysis Classes (2) |      |       |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                             |       |                                                           |      |       |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                                           |      |       |      |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                           |      |       |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                                           |      |       |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                                           |      |       |      |
| <b>Course requirements:</b><br>Continuous assessment: solving tasks at the board, elaboration of controlled homework, assessment from compulsory exercises<br>Indicative rating scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                        |       |                                                           |      |       |      |
| <b>Learning outcomes:</b><br>After completing the course, students will be able to use the apparatus of integral calculus of functions of one real variable, series and series of functions to solve appropriate computational and theoretical problems.                                                                                                                                                                                                          |       |                                                           |      |       |      |
| <b>Class syllabus:</b><br>Antiderivatives and indefinite integrals and techniques of integration. The definite integral and its properties. Integral as a limit of integral sums. Derivatives with variable endpoints. The fundamental theorem. Mean value theorems. Applications of the integral. Series of positive terms. Absolutely and conditionally convergent series. Series of functions. Pointwise and uniform convergence. Power series. Taylor series. |       |                                                           |      |       |      |
| <b>Recommended literature:</b><br>Cvičenia z matematickej analýzy II / Zbyněk Kubáček, Ján Valášek. Bratislava : Univerzita Komenského, 2010                                                                                                                                                                                                                                                                                                                      |       |                                                           |      |       |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                             |       |                                                           |      |       |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                                           |      |       |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 527                                                                                                                                                                                                                                                                                                                                                                                         |       |                                                           |      |       |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | B     | C                                                         | D    | E     | FX   |
| 47,06                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 13,85 | 16,7                                                      | 9,49 | 10,06 | 2,85 |

|                                                                    |
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| <b>Lecturers:</b> RNDr. Kristína Rostás, PhD., Mgr. Ivana Eliašová |
| <b>Last change:</b> 24.06.2022                                     |
| <b>Approved by:</b>                                                |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                           |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                           |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                           |
| <b>Course ID:</b><br>FMFI.KMANM/1-<br>MAT-750/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Course title:</b><br>Mathematical Analysis Classes (3) |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                           |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                           |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                           |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                           |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                           |
| <b>Course requirements:</b><br>Continuous assessment: solving tasks at the board, elaboration of controlled homework, assessment from compulsory exercises<br>Indicative rating scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                           |
| <b>Learning outcomes:</b><br>Absolvent of the subject has basic knowledge of metric spaces and differential calculus of scalar and vector functions of several variables and is capable of applying it for solving particular tasks in differential calculus of functions of several variables.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                           |
| <b>Class syllabus:</b><br>1. Metric spaces<br>n-dimensional Euclidean space $R_n$ , convergence and Cauchy sequence in $R_n$ , metric spaces, convergence in a metric space, complete metric space, normed space, Banach space, Banach fixed point theorem, topology of metric spaces, compact and convex sets, convex functions<br>2. Limit and continuity<br>limit and continuity in metric spaces, continuous vector functions, continuity and compactness<br>3. Differential calculus of functions of several variables<br>partial derivatives, gradient, total differential and differentiability, derivative of a compound function, directional derivative, Taylor theorem and local extrema<br>4. Implicitly given functions<br>implicit function theorem, constrained extrema, Lagrange multipliers |                                                           |
| <b>Recommended literature:</b><br>J. Filo, K. Rostás: $2^2 \times 13$ prednášok z matematickej analýzy, Vydavateľstvo UK, 2016.<br>W. Walter: Analysis 2. Springer, Berlin, 2002.<br>W. Rudin: Principles of mathematical analysis. McGraw-Hill, Singapore, 1976.<br>B. P. Děmidovič: Sbíрка úloh a cvičení z matematické analýzy. z ruského originálu přeložili Miroslav Rozložník a Miroslav Tůma. Fragment, Havlíčkův Brod, 2003.                                                                                                                                                                                                                                                                                                                                                                         |                                                           |

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|---------------------------------------------------------------------------|-------|-------|-------|------|------|
| I. Kľuvánek, L. Mišík, M. Švec: Matematika 1. SVTL, Bratislava, 1966.     |       |       |       |      |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English     |       |       |       |      |      |
| <b>Notes:</b>                                                             |       |       |       |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 397 |       |       |       |      |      |
| A                                                                         | B     | C     | D     | E    | FX   |
| 40,05                                                                     | 17,88 | 15,11 | 16,88 | 8,31 | 1,76 |
| <b>Lecturers:</b> RNDr. Kristína Rostás, PhD.                             |       |       |       |      |      |
| <b>Last change:</b> 24.06.2022                                            |       |       |       |      |      |
| <b>Approved by:</b>                                                       |       |       |       |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                           |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                           |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                           |
| <b>Course ID:</b><br>FMFI.KMANM/1-<br>MAT-775/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Course title:</b><br>Mathematical Analysis Classes (4) |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                           |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                           |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                           |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                           |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                           |
| <b>Course requirements:</b><br>Continuous assessment: solving tasks at the board, elaboration of controlled homework, assessment from compulsory exercises<br>Indicative rating scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                           |
| <b>Learning outcomes:</b><br>Absolvent of the subject has knowledge of integral calculus of functions of multiple variables and Fourier series and is capable of applying it for solving particular tasks of technical and natural sciences.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                           |
| <b>Class syllabus:</b><br>1. Curves and their parametrizations<br>Jordan curve, length of a curve, function of a path length, equivalent parametrizations<br>2. Line integrals<br>line integrals of first and second kind, path independence<br>3. Riemann integral in $\mathbb{R}^n$<br>Jordan measure, integral, parametric integrals, Fubini theorem, transformation of multiple integrals, improper parametric integrals<br>4. Integral theorems<br>Gauss integral theorem in $\mathbb{R}^2$ , surfaces in $\mathbb{R}^3$ and their area, surface integrals, Gauss integral theorem in $\mathbb{R}^3$ , Green formula, Stokes theorem<br>5. Fourier series<br>trigonometric series, even and odd functions, Fourier series |                                                           |
| <b>Recommended literature:</b><br>J. Filo, K. Rostás: $2^2 \times 13$ prednášok z matematickej analýzy, Vydavateľstvo UK, 2016.<br>W. Walter: Analysis 2. Springer, Berlin, 2002.<br>B. P. Děmidovič: Sbíрка úloh a cvičení z matematické analýzy. z ruského originálu přeložili Miroslav Rozložník a Miroslav Tůma. Fragment, Havlíčkův Brod, 2003.                                                                                                                                                                                                                                                                                                                                                                           |                                                           |

I. Kľuvánek, L. Mišík, M. Švec: Matematika 2. Alfa, Bratislava, 1970.  
M. Demetrian: Fourierove rady a Fourierov integrál, Univerzita Komenského, 2012  
J. Eliáš, J. Horváth, J. Kajan, R. Šulka: Zbierka úloh z vyššej matematiky, 4. časť, 3. vydanie, Alfa, 1979.

**Languages necessary to complete the course:**

Slovak, English

**Notes:**

**Past grade distribution**

Total number of evaluated students: 379

| A     | B     | C     | D     | E     | FX   |
|-------|-------|-------|-------|-------|------|
| 49,08 | 15,83 | 11,87 | 11,08 | 10,03 | 2,11 |

**Lecturers:** RNDr. Kristína Rostás, PhD., Mgr. Július Pačuta, PhD.

**Last change:** 24.06.2022

**Approved by:**

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                         |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                         |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                         |
| <b>Course ID:</b><br>FMFI.KAG/1-MAT-270/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Course title:</b><br>Matrix Calculus |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 1 <b>per level/semester:</b> 26 / 13<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                         |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                         |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                         |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                         |
| <b>Prerequisites:</b> FMFI.KAG/1-MAT-160/15 - Linear Algebra and Geometry (2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                         |
| <b>Course requirements:</b><br>Semester: homework, midterm exam<br>Exam: written exam<br>Approximate grade scheme: A 75%, B 65%, C 55%, D 45%, E 35%<br>Scale of assessment (preliminary/final): 50/50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                         |
| <b>Learning outcomes:</b><br>Student will gain basic theoretical knowledge to master the mathematical apparatus, which is standardly used to solve problems of applied mathematics. This course will provide her/him an overview how to solve various problems of numerical algebra.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                         |
| <b>Class syllabus:</b><br>Examples of the occurrence of matrices in practical tasks. LU-decomposition of a matrix and its modifications. Matrix norms. Projective (orthogonal and nonorthogonal) matrix. Last square problem. Generalized inverse matrix. QR-decomposition of a matrix (Gram-Schmidt orthogonalization, Householder's construction). Singular value decomposition of a matrix. Spectral properties of matrix. Gershgorin's theorem. Schur's theorem. Several canonical forms of matrix. Hessenberg form of a matrix. Matrix functions defined over spectra of matrices. Normal matrix. Symmetric, positive definite, Hermitian matrix. The introduction to Perron-Frobenius's theory of nonnegative matrices. Practical applications for problems of numerical algebra. |                                         |
| <b>Recommended literature:</b><br>Carl D. Meyer: Matrix Analysis and Applied Linear Algebra, SIAM, 2001<br>G. Strang: Linear Algebra and Its Applications, 4th edition, Cengage Learning, 2006<br>M. Fiedler: Speciální matice a jejich použití v numerické matematice, SNTL, Praha, 1981                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                         |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                         |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                         |

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|---------------------------------------------------------------|-------|-------|-------|-------|-----|
| <b>Past grade distribution</b>                                |       |       |       |       |     |
| Total number of evaluated students: 370                       |       |       |       |       |     |
| A                                                             | B     | C     | D     | E     | FX  |
| 12,16                                                         | 12,97 | 16,22 | 21,89 | 34,05 | 2,7 |
| <b>Lecturers:</b> Mgr. Martin Niepel, PhD., Mgr. Dávid Wilsch |       |       |       |       |     |
| <b>Last change:</b> 14.03.2022                                |       |       |       |       |     |
| <b>Approved by:</b>                                           |       |       |       |       |     |

## COURSE DESCRIPTION

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------------------------------------------------------------------|------|-------|-----|
| <b>Academic year:</b> 2021/2022                                                                                                                                                                             |      |                                                                       |      |       |     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                           |      |                                                                       |      |       |     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                             |      |                                                                       |      |       |     |
| <b>Course ID:</b><br>FMFI.KMANM/1-<br>MAT-185/00                                                                                                                                                            |      | <b>Course title:</b><br>Methods for Solving Mathematical Problems (1) |      |       |     |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning       |      |                                                                       |      |       |     |
| <b>Number of credits:</b> 2                                                                                                                                                                                 |      |                                                                       |      |       |     |
| <b>Recommended semester:</b> 1.                                                                                                                                                                             |      |                                                                       |      |       |     |
| <b>Educational level:</b> I.                                                                                                                                                                                |      |                                                                       |      |       |     |
| <b>Prerequisites:</b>                                                                                                                                                                                       |      |                                                                       |      |       |     |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                               |      |                                                                       |      |       |     |
| <b>Learning outcomes:</b>                                                                                                                                                                                   |      |                                                                       |      |       |     |
| <b>Class syllabus:</b><br>Solving problems of the mathematical analysis, algebra and discrete mathematics from past mathematical competitions. The range of solved problems will depend on students.        |      |                                                                       |      |       |     |
| <b>Recommended literature:</b><br>Hecht, T. - Sklenáriková, Z.: Metódy riešenia matematických úloh. SPN, Bratislava 1992.<br>Larson, L. C.: Metódy riešenia matematických problémov. Alfa, Bratislava 1990. |      |                                                                       |      |       |     |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                          |      |                                                                       |      |       |     |
| <b>Notes:</b>                                                                                                                                                                                               |      |                                                                       |      |       |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 161                                                                                                                                   |      |                                                                       |      |       |     |
| A                                                                                                                                                                                                           | B    | C                                                                     | D    | E     | FX  |
| 53,42                                                                                                                                                                                                       | 9,32 | 8,07                                                                  | 7,45 | 13,04 | 8,7 |
| <b>Lecturers:</b> RNDr. Monika Dillingerová, PhD.                                                                                                                                                           |      |                                                                       |      |       |     |
| <b>Last change:</b> 02.06.2015                                                                                                                                                                              |      |                                                                       |      |       |     |
| <b>Approved by:</b>                                                                                                                                                                                         |      |                                                                       |      |       |     |

## COURSE DESCRIPTION

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------|------|------|------|
| <b>Academic year:</b> 2021/2022                                                                                                                                                                             |       |                                                                       |      |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                           |       |                                                                       |      |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                             |       |                                                                       |      |      |      |
| <b>Course ID:</b><br>FMFI.KMANM/1-<br>MAT-186/00                                                                                                                                                            |       | <b>Course title:</b><br>Methods for Solving Mathematical Problems (2) |      |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning       |       |                                                                       |      |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                 |       |                                                                       |      |      |      |
| <b>Recommended semester:</b> 2.                                                                                                                                                                             |       |                                                                       |      |      |      |
| <b>Educational level:</b> I.                                                                                                                                                                                |       |                                                                       |      |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                       |       |                                                                       |      |      |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/1                                                                                                                               |       |                                                                       |      |      |      |
| <b>Learning outcomes:</b>                                                                                                                                                                                   |       |                                                                       |      |      |      |
| <b>Class syllabus:</b><br>Solving problems of the mathematical analysis, algebra and discrete mathematics from past mathematical competitions. The range of solved problems will depend on students.        |       |                                                                       |      |      |      |
| <b>Recommended literature:</b><br>Hecht, T. - Sklenáriková, Z.: Metódy riešenia matematických úloh. SPN, Bratislava 1992.<br>Larson, L. C.: Metódy riešenia matematických problémov. Alfa, Bratislava 1990. |       |                                                                       |      |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                          |       |                                                                       |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                               |       |                                                                       |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 77                                                                                                                                    |       |                                                                       |      |      |      |
| A                                                                                                                                                                                                           | B     | C                                                                     | D    | E    | FX   |
| 66,23                                                                                                                                                                                                       | 10,39 | 3,9                                                                   | 5,19 | 7,79 | 6,49 |
| <b>Lecturers:</b> RNDr. Monika Dillingerová, PhD.                                                                                                                                                           |       |                                                                       |      |      |      |
| <b>Last change:</b> 02.06.2015                                                                                                                                                                              |       |                                                                       |      |      |      |
| <b>Approved by:</b>                                                                                                                                                                                         |       |                                                                       |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                            |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                            |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                            |
| <b>Course ID:</b><br>FMFI.KAI/1-MAT-570/15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Course title:</b><br>Modelling and Rendering Techniques |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                            |
| <b>Number of credits:</b> 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                            |
| <b>Recommended semester:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                            |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                            |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                            |
| <b>Antirequisites:</b> FMFI.KAI/1-MAT-570/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                            |
| <b>Course requirements:</b><br>Continuous assessment: homework, individual work<br>Examination: written, oral<br>Indicative assessment scale: A 92%, B 84%, C 76%, D 68%, E 60%<br>For the semester, the student can get 50% for exercises, 30% for homework, the final written exam has a weight of 20% and the oral exam is voluntary for 20%. The student must solve at least 30% of each homework in order to pass the final written exam. Grading: 92-100 A, 84-91 B, 76-83 C, 68-75 D, 60-67 E. Details on the subject page.<br>Scale of assessment (preliminary/final): 30/70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                            |
| <b>Learning outcomes:</b><br>It acquaints students with the basic principles of geometric modeling, especially modeling of rigid teties, with the possibilities of local modifications of bodies and global operations on bodies represented by common techniques. Students will deepen their knowledge of rendering techniques.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                            |
| <b>Class syllabus:</b><br>The concept of geometric, quantitative and organizational model. Hierarchy in geometric models. Tools for defining objects, modifying them and storing them. Primitive (basic) objects and their most well-known characteristics. Local modifications and global operations with solids. CSG representation of objects (standard CSG primitives, regularized Boolean operations, identity transformations). Algorithm for construction of CSG - objects. Boundary representations of bodies (B - rep). Euler - Poincare formula and its meaning. Platonic bodies. Euler's operators. Boolean operations at border representations. Wall, edge and top representations of polyhedrons with non-variety surface. Solid modeling with polygonal meshes. Body modeling by sweeping methodology (extruded solids). Rendering techniques for shaded and color images. Object description-based rendering using implicit functions and CSG description. Basic principles of voxel rendering, image - oriented rendering and photo - modeling. Rendering of polygonal meshes. Rendering based on object or image redistribution techniques. |                                                            |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                            |

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| <b>Languages necessary to complete the course:</b><br>Slovak, English    |       |      |      |      |      |
| <b>Notes:</b>                                                            |       |      |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 41 |       |      |      |      |      |
| A                                                                        | B     | C    | D    | E    | FX   |
| 26,83                                                                    | 31,71 | 12,2 | 9,76 | 12,2 | 7,32 |
| <b>Lecturers:</b> prof. RNDr. Roman Ďurikovič, PhD.                      |       |      |      |      |      |
| <b>Last change:</b> 20.06.2022                                           |       |      |      |      |      |
| <b>Approved by:</b>                                                      |       |      |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                          |       |                                       |      |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                        |       |                                       |      |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                          |       |                                       |      |      |      |
| <b>Course ID:</b><br>FMFI.KAG/1-MAT-470/00                                                                                                                                                                                                                                                                                               |       | <b>Course title:</b><br>Number Theory |      |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                       |       |                                       |      |      |      |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                              |       |                                       |      |      |      |
| <b>Recommended semester:</b> 5.                                                                                                                                                                                                                                                                                                          |       |                                       |      |      |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                             |       |                                       |      |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                    |       |                                       |      |      |      |
| <b>Course requirements:</b><br>Homework assignments, exam<br>Indicative evaluation scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): Semester 25% (homework assignments) / 75% final exam (oral exam).                                                                                                |       |                                       |      |      |      |
| <b>Learning outcomes:</b><br>Students will be able to use basic results on divisibility and prime numbers to solve elementary number-theoretic problems. They will be able to use reciprocity laws to check whether a given number is a quadratic residue.                                                                               |       |                                       |      |      |      |
| <b>Class syllabus:</b><br>The divisibility in $\mathbb{Z}$ . Prime numbers, the prime number theorem and its applications. Elementary arithmetic functions. Perfect numbers. Congruences. The Euler's Totient Theorem. Pythagorean triangles.                                                                                            |       |                                       |      |      |      |
| <b>Recommended literature:</b><br>M. Kolibiar a kol.: Algebra a príbuzné disciplíny, Alfa, Bratislava, 1992<br>T. Šalát: Vybrané kapitoly z elementárnej teórie čísel, Univerzita Komenského, Bratislava, 1983<br>T. Šalát: Algebra a teoretická aritmetika (2), Alfa, Bratislava, 1986<br>Š. Znam: Teória čísel, Alfa, Bratislava, 1977 |       |                                       |      |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                       |       |                                       |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                            |       |                                       |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 164                                                                                                                                                                                                                                                                |       |                                       |      |      |      |
| A                                                                                                                                                                                                                                                                                                                                        | B     | C                                     | D    | E    | FX   |
| 71,95                                                                                                                                                                                                                                                                                                                                    | 11,59 | 7,93                                  | 3,05 | 3,05 | 2,44 |
| <b>Lecturers:</b> RNDr. Martin Sleziak, PhD.                                                                                                                                                                                                                                                                                             |       |                                       |      |      |      |

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| <b>Last change:</b> 18.06.2022 |
| <b>Approved by:</b>            |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                   |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                   |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                   |
| <b>Course ID:</b><br>FMFI.KMANM/1-<br>MAT-240/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Course title:</b><br>Numerical Mathematics (1) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                |                                                   |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                   |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                   |
| <b>Educational level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                   |
| <b>Prerequisites:</b> FMFI.KMANM/1-MAT-150/00 - Mathematical Analysis (2) or FMFI.KMANM/1-INF-150/00 - Mathematical Analysis (2) or FMFI.KAMŠ/1-DAV-102/20 - Calculus (1)                                                                                                                                                                                                                                                                                                                                                                                               |                                                   |
| <b>Course requirements:</b><br>Preliminary assessment: 2 written tests 10 points each, individual work 10 points<br>Final examination: written exam for 50 points and oral exam for 20 points<br>Indicative assessment scale: A 88%, B 78%, C 68%, D 58%, E 48%<br>Scale of assessment (preliminary/final): 30/70                                                                                                                                                                                                                                                       |                                                   |
| <b>Learning outcomes:</b><br>After completing the course, students will be able to solve numerical mathematics problems from mathematical analysis, algebra, applied mathematics and practice using computers and available software.                                                                                                                                                                                                                                                                                                                                   |                                                   |
| <b>Class syllabus:</b><br>Position of numerical mathematics in solving of real problems. Concept of stability. Errors and computational arithmetic. The solution of nonlinear equations. Solution of system nonlinear equations. Approximation of functions. Interpolation - Lagrange's and Newton's interpolation polynomial and their errors. Optimal selection of interpolations point. Chebyshev polynomials. Linear and cubic splines. The least square method. Numerical differentiation. Numerical quadrature.<br>The solution of simultaneous linear equations. |                                                   |
| <b>Recommended literature:</b><br>Lars Eldén, Linde Wittmeyer-Koch: Numerical analysis An Introduction ACADEMIC Press, INC, San Diego, 1990.<br>J. Babušíková, M. Slodička, J. Weisz : Numerická matematika , UK Bratislava, 1999 (skriptá).<br>S. Míka: Numerické metody algebry, SNTL Praha 1982.<br>P. Příkryl: Numerické metody matematické analýzy, SNTL Praha 1985.<br>A. Ralston: A first course in numerical analysis, New York, 1965.<br>R. L.Burden, J. D. Faires: Numerical Analysis, Cengage Learning, 2010.                                                |                                                   |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                   |

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|-------------------------------------------------------------------------|-------|-------|------|-------|-----|
| Slovak and English                                                      |       |       |      |       |     |
| <b>Notes:</b>                                                           |       |       |      |       |     |
| <b>Past grade distribution</b>                                          |       |       |      |       |     |
| Total number of evaluated students: 884                                 |       |       |      |       |     |
| A                                                                       | B     | C     | D    | E     | FX  |
| 18,21                                                                   | 23,64 | 23,08 | 15,5 | 16,97 | 2,6 |
| <b>Lecturers:</b> Mgr. Jela Babušíková, PhD., RNDr. Patrik Mihala, PhD. |       |       |      |       |     |
| <b>Last change:</b> 21.06.2022                                          |       |       |      |       |     |
| <b>Approved by:</b>                                                     |       |       |      |       |     |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                   |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                   |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                   |
| <b>Course ID:</b><br>FMFI.KMANM/1-<br>MAT-780/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Course title:</b><br>Numerical Mathematics (2) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                       |                                                   |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                   |
| <b>Recommended semester:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                   |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                   |
| <b>Prerequisites:</b> FMFI.KMANM/1-MAT-240/00 - Numerical Mathematics (1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                   |
| <b>Course requirements:</b><br>Continuous assessment: individual work, test<br>Exam: Written and oral test<br>Scale of assessment (preliminary/final): 40/60                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                   |
| <b>Learning outcomes:</b><br>After completing this course, students are able to numerically solve more specific mathematics problems.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                   |
| <b>Class syllabus:</b><br>Polynomial interpolation and various types of cubic splines. General least square method - trigonometric polynomial, Chebyshev expansions. Polynomial roots - Graeff and Bairstow methods. Gauss quadrature. Approximation of eigenvalues and eigenvectors.                                                                                                                                                                                                                                                                                                                                          |                                                   |
| <b>Recommended literature:</b><br>Lars Eldén, Linde Wittmeyer-Koch: Numerical analysis An Introduction ACADEMIC Press, INC, San Diego, 1990.<br>Jela Babušíková, Marián Slodička, Juraj Weisz: Numerické metódy, Bratislava : Univerzita Komenského, 2000<br>Stanislav Míka: Numerické metody algebry, Praha : Státní nakladatelství technické literatury, 1985<br>Petr Přikryl: Numerické metody matematické analýzy, Praha : Státní nakladatelství technické literatury, 1985<br>R. L.Burden, J. D. Faires: Numerical Analysis, Cengage Learning, 2010.<br>A. Ralston: A first course in numerical analysis, New York, 1965. |                                                   |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                   |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                   |

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|-------------------------------------------------------------------------|-------|-------|-------|-------|------|
| <b>Past grade distribution</b>                                          |       |       |       |       |      |
| Total number of evaluated students: 613                                 |       |       |       |       |      |
| A                                                                       | B     | C     | D     | E     | FX   |
| 17,46                                                                   | 24,96 | 22,35 | 19,74 | 14,36 | 1,14 |
| <b>Lecturers:</b> Mgr. Jela Babušíková, PhD., RNDr. Patrik Mihala, PhD. |       |       |       |       |      |
| <b>Last change:</b> 21.06.2022                                          |       |       |       |       |      |
| <b>Approved by:</b>                                                     |       |       |       |       |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                             |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                             |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                             |
| <b>Course ID:</b><br>FMFI.KAG/1-MAT-530/15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Course title:</b><br>Numerical Methods of Linear Algebra |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                |                                                             |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                             |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                             |
| <b>Educational level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                             |
| <b>Prerequisites:</b> FMFI.KAG/1-MAT-270/00 - Matrix Calculus                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                             |
| <b>Antirequisites:</b> FMFI.KMANM/1-MAT-530/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                             |
| <b>Course requirements:</b><br>Interim evaluation: Programing exercises - 30% of final grade<br>Final Exam: Oral examination - 70% of final grade<br>Student need at least half of the maximum number of points to be able to attend the final exam.<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 30% homework / 70% final exam                                                                                                                                        |                                                             |
| <b>Learning outcomes:</b><br>theoretical knowledge and practical experience (through available software and the creation of a separate program) with various numerical methods for solving linear algebra problems; ability to deal with the stability of the solution (analysis of the causes of instability, the limit of the possibility of its elimination) and error estimation                                                                                                                                                    |                                                             |
| <b>Class syllabus:</b><br>Direct methods for solving a regular system of linear algebraic equations. Solution stability and error estimation. Iterative methods of regular system solution. Least squares problem for singular matrices with complete rank (QR-decomposition) and incomplete rank (pseudoinversion, regularization). Numerical methods for solving partial and complete eigenvalue problems (for symmetric and asymmetric matrices). Stability of eigenvalues problem. Numerical calculation of singular decomposition. |                                                             |
| <b>Recommended literature:</b><br>Numerické metódy lineárnej algebry / Tat'jana Bušinská. Bratislava : Univerzita Komenského, 1993<br>G. H. Golub, C. F. Van Loan: Matrix Computations, John's Hopkins University Press, 1996<br>J. W. Demmel: Applied Numerical Linear Algebra, Society for Industrial and Applied Mathematics, 1997<br>C. D. Meyer: Matrix Analysis and Applied Linear Algebra, SIAM, 2000                                                                                                                            |                                                             |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                             |

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|-----------------------------------------------------------------------------|-------|------|------|------|------|
| Slovak, English                                                             |       |      |      |      |      |
| <b>Notes:</b>                                                               |       |      |      |      |      |
| <b>Past grade distribution</b>                                              |       |      |      |      |      |
| Total number of evaluated students: 16                                      |       |      |      |      |      |
| A                                                                           | B     | C    | D    | E    | FX   |
| 31,25                                                                       | 18,75 | 25,0 | 12,5 | 6,25 | 6,25 |
| <b>Lecturers:</b> prof. RNDr. Július Korbaš, CSc., Mgr. Ľudovít Balko, PhD. |       |      |      |      |      |
| <b>Last change:</b> 22.06.2022                                              |       |      |      |      |      |
| <b>Approved by:</b>                                                         |       |      |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                 |                                                                 |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                               |                                                                 |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                 |                                                                 |
| <b>Course ID:</b><br>FMFI.KI/1-MAT-230/15                                                                                                                                                                                                                                                                                                                       | <b>Course title:</b><br>Operation Systems and Computer Networks |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                     |                                                                 |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                     |                                                                 |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                                                 |                                                                 |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                    |                                                                 |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                           |                                                                 |
| <b>Antirequisites:</b> FMFI.KI/1-MAT-230/00                                                                                                                                                                                                                                                                                                                     |                                                                 |
| <b>Course requirements:</b><br>Activity during lectures (50%), written test (50%)<br>Approximate grading scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                             |                                                                 |
| <b>Learning outcomes:</b><br>After completing the course, students will have an overview of the principles of computer operation, the tasks and principles of operating systems and the principles of operation and secure use of computer networks and their services.                                                                                         |                                                                 |
| <b>Class syllabus:</b><br>Basic concepts of computer systems (processor, memory, input-output devices).<br>Basic concepts of operating systems, processes, memory management, input and output management, file systems, access control, virtualization.<br>Basic concepts of computer networks, reference model OSI, TCP/IP, e-mail and web, security aspects. |                                                                 |
| <b>Recommended literature:</b><br>Computer networks / Andrew S. Tanenbaum. Upper Saddle River : Prentice-Hall, 2003<br>Operating systems : Internals and design principles / William Stallings. Upper Saddle River : Pearson/ Prentice Hall, 2005<br>Teachers' own electronic texts published on the course's web page.                                         |                                                                 |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                           |                                                                 |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                   |                                                                 |

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|------------------------------------------------|-------|-------|------|------|------|
| <b>Past grade distribution</b>                 |       |       |      |      |      |
| Total number of evaluated students: 52         |       |       |      |      |      |
| A                                              | B     | C     | D    | E    | FX   |
| 50,0                                           | 21,15 | 11,54 | 9,62 | 3,85 | 3,85 |
| <b>Lecturers:</b> RNDr. Jaroslav Janáček, PhD. |       |       |      |      |      |
| <b>Last change:</b> 22.06.2022                 |       |       |      |      |      |
| <b>Approved by:</b>                            |       |       |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                             |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                             |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                             |
| <b>Course ID:</b><br>FMFI.KMANM/1-<br>MAT-310/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Course title:</b><br>Ordinary Differential Equations (1) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                             |                                                             |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                             |
| <b>Recommended semester:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                             |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                             |
| <b>Prerequisites:</b> FMFI.KMANM/1-MAT-210/00 - Mathematical Analysis (3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                             |
| <b>Recommended prerequisites:</b><br>1-MAT-250 Mathematical Analysis (4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                             |
| <b>Course requirements:</b><br>interim and final exam:<br>continuous examination: tests(45%); final exam: written test(35%) and oral examination(20%)<br>Grades:<br>100-91% (A); 90-81% (B); 80-71% (C); 70-61% (D); 60-51% (E), 50-0% (Fx)<br>Scale of assessment (preliminary/final): 45/55                                                                                                                                                                                                                                                                                                                        |                                                             |
| <b>Learning outcomes:</b><br>The graduate will acquire basic knowledge of the theory of ordinary differential equations, which will enable him to follow the lectures Ordinary Differential Equations (2) and Dynamical Systems. He will be able to apply this theory in the analysis of some simpler mathematical models from the field of natural and technical sciences.                                                                                                                                                                                                                                          |                                                             |
| <b>Class syllabus:</b><br>Mathematical models in the form of differential equations (DE). Basic methods of solving of differential equations. Systems of differential equations with continuous right-hand sides: The existence and uniqueness. Picard's theorem on the existence and uniqueness of solutions. The Peano existence theorem. Linear systems of differential equations and linear n-th order differential equations. Higher order linear differential equations with constant coefficients. Laplace transform and its application in solving linear differential equations with constant coefficients. |                                                             |
| <b>Recommended literature:</b><br>M. Greguš, M. Švec, V. Šeda: Obyčajné diferenciálne rovnice, Alfa, 1985.<br>I. Bock, Ľ. Marko: Diferenciálne rovnice, skriptá, FEI STU<br>B. P. Demidovič: Lekcii po matematičeskoj teorii ustojčivosti, Nauka<br>J. Nagy: Diferenciálne rovnice, SNTL Praha<br>M. Medved': Dynamické systémy, UK Bratislava 2000.                                                                                                                                                                                                                                                                 |                                                             |

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| J. Kurzweil: Obyčejné diferenciální rovnice- Úvod do teorie obyčejných diferenciálních rovnic v reálném oboru, Státní nakladatelství technické literatury, Praha 1978. |       |       |       |      |     |
| <b>Languages necessary to complete the course:</b><br>Slovak                                                                                                           |       |       |       |      |     |
| <b>Notes:</b>                                                                                                                                                          |       |       |       |      |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 287                                                                                              |       |       |       |      |     |
| A                                                                                                                                                                      | B     | C     | D     | E    | FX  |
| 37,63                                                                                                                                                                  | 18,82 | 19,86 | 12,89 | 10,1 | 0,7 |
| <b>Lecturers:</b> prof. RNDr. Milan Medved', DrSc., prof. RNDr. Ján Filo, CSc., RNDr. František Jaroš, PhD.                                                            |       |       |       |      |     |
| <b>Last change:</b> 21.06.2022                                                                                                                                         |       |       |       |      |     |
| <b>Approved by:</b>                                                                                                                                                    |       |       |       |      |     |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                                             |      |      |     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                                             |      |      |     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                                             |      |      |     |
| <b>Course ID:</b><br>FMFI.KMANM/1-MAT-425/00                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       | <b>Course title:</b><br>Ordinary Differential Equations (2) |      |      |     |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                   |       |                                                             |      |      |     |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                                             |      |      |     |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                                             |      |      |     |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                             |      |      |     |
| <b>Prerequisites:</b> FMFI.KMANM/1-MAT-310/00 - Ordinary Differential Equations (1)                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                                             |      |      |     |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 20/80                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                                             |      |      |     |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                             |      |      |     |
| <b>Class syllabus:</b><br>1. Continuation of the theory of systems of differential equations.<br>2. Existence, uniqueness and dependence of solutions on initial conditions and parameters.<br>3. Qualitative theory of differential equations.<br>4. Autonomous systems and their properties. Method of linearization.<br>5. Differential inequalities.<br>6. Asymptotic properties and stability of solutions.<br>7. Boundary value problems, eigenfunctions and eigenvalues.<br>8. Comparison theorems. |       |                                                             |      |      |     |
| <b>Recommended literature:</b><br>Greguš, M. - Švec, M. - Šeda, V.: Obyčajné diferenciálne rovnice, Alfa, Bratislava 1985.<br>Brikhoff, G. - Rota, G. C.: Ordinary Differential Equations, Ginn and Co., 1962.<br>Kurzweil, J.: Obyčejné diferenciální rovnice, SNTL, Praha 1978.<br>Redheffer, R.: Differential Equations. Theory and Applications, Jones & Bartlett Publish., Boston 1991.                                                                                                               |       |                                                             |      |      |     |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                                             |      |      |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                                             |      |      |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 68                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                             |      |      |     |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | B     | C                                                           | D    | E    | FX  |
| 55,88                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 14,71 | 13,24                                                       | 8,82 | 7,35 | 0,0 |
| <b>Lecturers:</b> prof. RNDr. Jaroslav Jaroš, CSc., RNDr. František Jaroš, PhD.                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                                             |      |      |     |

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| <b>Last change:</b> 02.06.2015 |
| <b>Approved by:</b>            |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |                                                          |     |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                     |     |                                                          |     |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |                                                          |     |      |      |
| <b>Course ID:</b><br>FMFL.KTV/1-MXX-110/00                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     | <b>Course title:</b><br>Physical Education and Sport (1) |     |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                        |     |                                                          |     |      |      |
| <b>Number of credits:</b> 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |                                                          |     |      |      |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |                                                          |     |      |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |     |                                                          |     |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |                                                          |     |      |      |
| <b>Course requirements:</b><br>Grades: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                            |     |                                                          |     |      |      |
| <b>Learning outcomes:</b><br>Orientation in the history of the selected sports discipline, mastering the basic principles of compensation of mostly mental burdens of the individual. Creating a positive, lasting relationship to physical education and sports in the sense of calocagation. Mastering the demands for the development of motor abilities, skills, proper technique of performing individual movements in individual sports, individual game activities in collective sports games. |     |                                                          |     |      |      |
| <b>Class syllabus:</b><br>Introduction to the basic history of the selected sport, with the basic principles of compensation of one-sided psychological burden of the individual's body. Development of basic motor skills with a stop to all kinds of endurance, coordination, increasing the level of joint mobility. Training of individual game activities in collective sports games. In individual sports disciplines, practice of basic techniques of individual elements.                     |     |                                                          |     |      |      |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |     |                                                          |     |      |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |                                                          |     |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |                                                          |     |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 5698                                                                                                                                                                                                                                                                                                                                                                                                                            |     |                                                          |     |      |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | B   | C                                                        | D   | E    | FX   |
| 95,35                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1,7 | 0,12                                                     | 0,0 | 0,07 | 2,76 |
| <b>Lecturers:</b> Mgr. Ladislav Mókus, PaedDr. Dana Mašlejová, Mgr. Jana Leginusová, Mgr. Tomáš Kuchár, PhD., PaedDr. Mikuláš Ortutay, Mgr. Martin Dovičák, PhD., Mgr. Júlia Raábová, PhD., Mgr. Branislav Nedbálek, Mgr. Tomáš Lovecký                                                                                                                                                                                                                                                               |     |                                                          |     |      |      |

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| <b>Last change:</b> 16.06.2022 |
| <b>Approved by:</b>            |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                              |      |                                                          |      |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                            |      |                                                          |      |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                              |      |                                                          |      |      |      |
| <b>Course ID:</b><br>FMFL.KTV/1-MXX-120/00                                                                                                                                                                                                                                                                                                                                                                                   |      | <b>Course title:</b><br>Physical Education and Sport (2) |      |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                        |      |                                                          |      |      |      |
| <b>Number of credits:</b> 0                                                                                                                                                                                                                                                                                                                                                                                                  |      |                                                          |      |      |      |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                              |      |                                                          |      |      |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                 |      |                                                          |      |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                        |      |                                                          |      |      |      |
| <b>Course requirements:</b>                                                                                                                                                                                                                                                                                                                                                                                                  |      |                                                          |      |      |      |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                                                                                                                                                    |      |                                                          |      |      |      |
| <b>Class syllabus:</b><br>Practising offensive and defensive combinations and game at modified rules in collective games such as basketball, volleyball, soccer, floorball. Command of elements of higher difficulty in terms of the level of the activity abilities (crawl stroke, breast stroke, butterfly stroke, trampoline jump, aerobic compositions with steps, fitball, elastic gums, paddling on the running water. |      |                                                          |      |      |      |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                                                                                                                                               |      |                                                          |      |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                           |      |                                                          |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                |      |                                                          |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 4814                                                                                                                                                                                                                                                                                                                                                   |      |                                                          |      |      |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                            | B    | C                                                        | D    | E    | FX   |
| 96,72                                                                                                                                                                                                                                                                                                                                                                                                                        | 1,62 | 0,1                                                      | 0,06 | 0,04 | 1,45 |
| <b>Lecturers:</b> Mgr. Tomáš Kuchár, PhD., PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, Mgr. Jana Leginusová, PaedDr. Mikuláš Ortutay, Mgr. Martin Dovičák, PhD., Mgr. Júlia Raábová, PhD., Mgr. Branislav Nedbálek, Mgr. Tomáš Lovecký                                                                                                                                                                                      |      |                                                          |      |      |      |
| <b>Last change:</b> 02.06.2015                                                                                                                                                                                                                                                                                                                                                                                               |      |                                                          |      |      |      |
| <b>Approved by:</b>                                                                                                                                                                                                                                                                                                                                                                                                          |      |                                                          |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                         |     |                                                          |      |     |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                       |     |                                                          |      |     |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                         |     |                                                          |      |     |      |
| <b>Course ID:</b><br>FMFL.KTV/1-MXX-210/00                                                                                                                                                                                              |     | <b>Course title:</b><br>Physical Education and Sport (3) |      |     |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                          |     |                                                          |      |     |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                             |     |                                                          |      |     |      |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                         |     |                                                          |      |     |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                            |     |                                                          |      |     |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                   |     |                                                          |      |     |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                           |     |                                                          |      |     |      |
| <b>Learning outcomes:</b>                                                                                                                                                                                                               |     |                                                          |      |     |      |
| <b>Class syllabus:</b><br>To practise game combinations, tactical - mechanical elements in basketball, volleyball, soccer, floorball, ice hockey, badminton, competition rules in the sports specialization.                            |     |                                                          |      |     |      |
| <b>Recommended literature:</b>                                                                                                                                                                                                          |     |                                                          |      |     |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                   |     |                                                          |      |     |      |
| <b>Notes:</b>                                                                                                                                                                                                                           |     |                                                          |      |     |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 2799                                                                                                                                                              |     |                                                          |      |     |      |
| A                                                                                                                                                                                                                                       | B   | C                                                        | D    | E   | FX   |
| 98,54                                                                                                                                                                                                                                   | 0,5 | 0,11                                                     | 0,04 | 0,0 | 0,82 |
| <b>Lecturers:</b> Mgr. Tomáš Kuchár, PhD., Mgr. Jana Leginusová, PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, PaedDr. Mikuláš Ortutay, Mgr. Martin Dovičák, PhD., Mgr. Júlia Raábová, PhD., Mgr. Branislav Nedbálek, Mgr. Tomáš Lovecký |     |                                                          |      |     |      |
| <b>Last change:</b> 16.06.2022                                                                                                                                                                                                          |     |                                                          |      |     |      |
| <b>Approved by:</b>                                                                                                                                                                                                                     |     |                                                          |      |     |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                             |      |                                                          |      |     |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                           |      |                                                          |      |     |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                             |      |                                                          |      |     |      |
| <b>Course ID:</b><br>FMFI.KTV/1-MXX-220/00                                                                                                                                                                                                  |      | <b>Course title:</b><br>Physical Education and Sport (4) |      |     |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                              |      |                                                          |      |     |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                 |      |                                                          |      |     |      |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                             |      |                                                          |      |     |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                |      |                                                          |      |     |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                       |      |                                                          |      |     |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                               |      |                                                          |      |     |      |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                   |      |                                                          |      |     |      |
| <b>Class syllabus:</b><br>Preparation for sport championships of the Faculty in the chosen sport at modified rules. The selection of talented students into the teams of the University and Faculty leagues and other faculty sport events. |      |                                                          |      |     |      |
| <b>Recommended literature:</b>                                                                                                                                                                                                              |      |                                                          |      |     |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                       |      |                                                          |      |     |      |
| <b>Notes:</b>                                                                                                                                                                                                                               |      |                                                          |      |     |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 2518                                                                                                                                                                  |      |                                                          |      |     |      |
| A                                                                                                                                                                                                                                           | B    | C                                                        | D    | E   | FX   |
| 98,53                                                                                                                                                                                                                                       | 0,16 | 0,08                                                     | 0,04 | 0,0 | 1,19 |
| <b>Lecturers:</b> Mgr. Tomáš Kuchár, PhD., Mgr. Ladislav Mókus, Mgr. Jana Leginusová, PaedDr. Dana Mašlejová, PaedDr. Mikuláš Ortutay, Mgr. Martin Dovičák, PhD., Mgr. Júlia Raábová, PhD., Mgr. Branislav Nedbálek, Mgr. Tomáš Lovecký     |      |                                                          |      |     |      |
| <b>Last change:</b> 15.03.2022                                                                                                                                                                                                              |      |                                                          |      |     |      |
| <b>Approved by:</b>                                                                                                                                                                                                                         |      |                                                          |      |     |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                         |      |                                                          |     |     |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                       |      |                                                          |     |     |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                         |      |                                                          |     |     |      |
| <b>Course ID:</b><br>FMFL.KTV/1-MXX-310/00                                                                                                                                                                                              |      | <b>Course title:</b><br>Physical Education and Sport (5) |     |     |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                   |      |                                                          |     |     |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                             |      |                                                          |     |     |      |
| <b>Recommended semester:</b> 5.                                                                                                                                                                                                         |      |                                                          |     |     |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                            |      |                                                          |     |     |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                   |      |                                                          |     |     |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                           |      |                                                          |     |     |      |
| <b>Learning outcomes:</b>                                                                                                                                                                                                               |      |                                                          |     |     |      |
| <b>Class syllabus:</b><br>Preparation and participation of individuals and teams in the system of university sport competitions and sport events.                                                                                       |      |                                                          |     |     |      |
| <b>Recommended literature:</b>                                                                                                                                                                                                          |      |                                                          |     |     |      |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                   |      |                                                          |     |     |      |
| <b>Notes:</b>                                                                                                                                                                                                                           |      |                                                          |     |     |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 1864                                                                                                                                                              |      |                                                          |     |     |      |
| A                                                                                                                                                                                                                                       | B    | C                                                        | D   | E   | FX   |
| 98,98                                                                                                                                                                                                                                   | 0,38 | 0,11                                                     | 0,0 | 0,0 | 0,54 |
| <b>Lecturers:</b> Mgr. Tomáš Kuchár, PhD., Mgr. Ladislav Mókus, Mgr. Jana Leginusová, PaedDr. Dana Mašlejová, PaedDr. Mikuláš Ortutay, Mgr. Martin Dovičák, PhD., Mgr. Júlia Raábová, PhD., Mgr. Branislav Nedbálek, Mgr. Tomáš Lovecký |      |                                                          |     |     |      |
| <b>Last change:</b> 15.03.2022                                                                                                                                                                                                          |      |                                                          |     |     |      |
| <b>Approved by:</b>                                                                                                                                                                                                                     |      |                                                          |     |     |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                         |      |                                                          |     |     |     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                       |      |                                                          |     |     |     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                         |      |                                                          |     |     |     |
| <b>Course ID:</b><br>FMFL.KTV/1-MXX-320/00                                                                                                                                                                                              |      | <b>Course title:</b><br>Physical Education and Sport (6) |     |     |     |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                   |      |                                                          |     |     |     |
| <b>Number of credits:</b> 2                                                                                                                                                                                                             |      |                                                          |     |     |     |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                         |      |                                                          |     |     |     |
| <b>Educational level:</b> I.                                                                                                                                                                                                            |      |                                                          |     |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                   |      |                                                          |     |     |     |
| <b>Course requirements:</b>                                                                                                                                                                                                             |      |                                                          |     |     |     |
| <b>Learning outcomes:</b>                                                                                                                                                                                                               |      |                                                          |     |     |     |
| <b>Class syllabus:</b><br>Using the communication in the physical education and sport and organizing the sport championships to achieve expressive motion of the sport and health in a valuable orientation the students.               |      |                                                          |     |     |     |
| <b>Recommended literature:</b>                                                                                                                                                                                                          |      |                                                          |     |     |     |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                      |      |                                                          |     |     |     |
| <b>Notes:</b>                                                                                                                                                                                                                           |      |                                                          |     |     |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 1630                                                                                                                                                              |      |                                                          |     |     |     |
| A                                                                                                                                                                                                                                       | B    | C                                                        | D   | E   | FX  |
| 98,71                                                                                                                                                                                                                                   | 0,37 | 0,12                                                     | 0,0 | 0,0 | 0,8 |
| <b>Lecturers:</b> PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, Mgr. Jana Leginusová, Mgr. Tomáš Kuchár, PhD., PaedDr. Mikuláš Ortutay, Mgr. Martin Dovičák, PhD., Mgr. Júlia Raábová, PhD., Mgr. Branislav Nedbálek, Mgr. Tomáš Lovecký |      |                                                          |     |     |     |
| <b>Last change:</b> 02.06.2015                                                                                                                                                                                                          |      |                                                          |     |     |     |
| <b>Approved by:</b>                                                                                                                                                                                                                     |      |                                                          |     |     |     |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                             |       |                                                   |      |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                           |       |                                                   |      |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                             |       |                                                   |      |      |      |
| <b>Course ID:</b><br>FMFI.KAMŠ/1-PMA-551/14                                                                                                                                                                                                                                                 |       | <b>Course title:</b><br>Probability Distributions |      |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                          |       |                                                   |      |      |      |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                 |       |                                                   |      |      |      |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                                                                             |       |                                                   |      |      |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                |       |                                                   |      |      |      |
| <b>Prerequisites:</b> FMFI.KAMŠ/1-MAT-281/00 - Probability and Statistics (1) or FMFI.KAMŠ/1-INF-435/13 - Probability and Statistics or FMFI.KAMŠ/1-UMA-302/15 - Probability Measure and Mathematical Statistics (1) or FMFI.KAMŠ/1-DAV-201/20 - Fundamentals of Probability and Statistics |       |                                                   |      |      |      |
| <b>Course requirements:</b>                                                                                                                                                                                                                                                                 |       |                                                   |      |      |      |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                   |       |                                                   |      |      |      |
| <b>Class syllabus:</b>                                                                                                                                                                                                                                                                      |       |                                                   |      |      |      |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                              |       |                                                   |      |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                          |       |                                                   |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                               |       |                                                   |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 58                                                                                                                                                                                                                    |       |                                                   |      |      |      |
| A                                                                                                                                                                                                                                                                                           | B     | C                                                 | D    | E    | FX   |
| 58,62                                                                                                                                                                                                                                                                                       | 20,69 | 13,79                                             | 1,72 | 3,45 | 1,72 |
| <b>Lecturers:</b> doc. Mgr. Radoslav Harman, PhD.                                                                                                                                                                                                                                           |       |                                                   |      |      |      |
| <b>Last change:</b> 29.11.2021                                                                                                                                                                                                                                                              |       |                                                   |      |      |      |
| <b>Approved by:</b>                                                                                                                                                                                                                                                                         |       |                                                   |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                                |       |      |     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                                |       |      |     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                                |       |      |     |
| <b>Course ID:</b><br>FMFI.KAMŠ/1-PMA-520/00                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       | <b>Course title:</b><br>Probability Theory (1) |       |      |     |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                             |       |                                                |       |      |     |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                                |       |      |     |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                                |       |      |     |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                |       |      |     |
| <b>Prerequisites:</b> FMFI.KAMŠ/1-MAT-282/00 - Probability and Statistics (2)                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                |       |      |     |
| <b>Course requirements:</b><br>During the semester there will be a written test for max. 30 points. A maximum of 70 points can be obtained from the exam.                                                                                                                                                                                                                                                                                                                                      |       |                                                |       |      |     |
| <b>Learning outcomes:</b><br>The students will become acquainted with the theory of stable distributions, large deviations, and the single big jump principle.                                                                                                                                                                                                                                                                                                                                 |       |                                                |       |      |     |
| <b>Class syllabus:</b><br>Stable distributions: definition, explicit densities, characteristic functions, properties. Generalised central limit theorem for sums of independent identically distributed (iid) variables with infinite second moment. Large deviation theory for sums of iid variables: moment generating function, exponential tilting, deviation function. Heavy-tailed and subexponential distributions: single big jump principle for sums of iid subexponential variables. |       |                                                |       |      |     |
| <b>Recommended literature:</b><br>Nolan, John P. Univariate stable distributions. New York: Springer, 2020.<br>Borovkov, Alexandr A. Probability theory. New York: Springer, 2013.<br>Foss et al. An introduction to heavy-tailed and subexponential distributions. New York: Springer, 2011.                                                                                                                                                                                                  |       |                                                |       |      |     |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                                |       |      |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                |       |      |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 277                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                                |       |      |     |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | B     | C                                              | D     | E    | FX  |
| 13,72                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 15,16 | 17,33                                          | 19,49 | 27,8 | 6,5 |
| <b>Lecturers:</b> doc. Mgr. Pavol Bokes, PhD.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                |       |      |     |

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| <b>Last change:</b> 10.03.2022 |
| <b>Approved by:</b>            |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                        |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                        |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                         |                                                        |
| <b>Course ID:</b><br>FMFI.KAMŠ/1-MAT-281/00                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Course title:</b><br>Probability and Statistics (1) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 1 <b>per level/semester:</b> 26 / 13<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                |                                                        |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                        |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                        |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                        |
| <b>Prerequisites:</b> (FMFI.KMANM/1-MAT-150/00 - Mathematical Analysis (2) or FMFI.KMANM/1-MMN-150/15 - Mathematical Analysis (2) or FMFI.KAMŠ/1-EFM-130/00 - Mathematical Analysis (2)) and (FMFI.KAG/1-MAT-120/15 - Linear Algebra and Geometry (1) or FMFI.KAG/1-MMN-120/00 - Linear Algebra and Geometry (1) or FMFI.KAG/1-EFM-121/15 - Linear Algebra and Geometry (1))                                                                                            |                                                        |
| <b>Course requirements:</b><br>Preliminary semester evaluation: a test<br>Examination: written examination<br>Approximate grade thresholds: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 50/50                                                                                                                                                                                                                                         |                                                        |
| <b>Learning outcomes:</b><br>After completing the course the student will be able to use classical probability models, axiomatic approach to the definition of probability. He will master one dimensional discrete and continuous random variables. He will be given an introduction to selected statistical procedures: point and interval estimates of parameters sampling normal distribution.                                                                      |                                                        |
| <b>Class syllabus:</b><br>Probability space. Classical probability models. Random variable and distribution function. Elementary discrete and continuous distributions, expectation and variance. Independence and correlation. Normal distribution and the central limit theorem. Random sample, sample mean, sample variance. Sampling normal distribution. Estimation of parameters, maximal likelihood, confidence intervals for the mean of a normal distribution. |                                                        |
| <b>Recommended literature:</b><br>Janková, K., Pázman, A.: Pravdepodobnosť a štatistika, Vydavateľstvo UK 2011<br>Harman, R., Honschová, E., Somorčík, J.: Zbierka úloh zo základov teórie pravdepodobnosti, Paci Bratislava 2009<br>G.R.Grimmett, D. Stirzaker: Probability and Random Processes. Oxford University Press 2001                                                                                                                                         |                                                        |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                   |                                                        |

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| <b>Notes:</b>                                                                                                   |       |       |       |       |      |
| <b>Past grade distribution</b>                                                                                  |       |       |       |       |      |
| Total number of evaluated students: 1345                                                                        |       |       |       |       |      |
| A                                                                                                               | B     | C     | D     | E     | FX   |
| 17,17                                                                                                           | 12,49 | 18,07 | 21,78 | 24,76 | 5,72 |
| <b>Lecturers:</b> doc. RNDr. Katarína Janková, CSc., Mgr. Livia Rosová, PhD., Ing. Assa Camara, Mgr. Ján Veselý |       |       |       |       |      |
| <b>Last change:</b> 09.03.2022                                                                                  |       |       |       |       |      |
| <b>Approved by:</b>                                                                                             |       |       |       |       |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                        |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                        |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                        |
| <b>Course ID:</b><br>FMFI.KAMŠ/1-MAT-282/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Course title:</b><br>Probability and Statistics (2) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 1 <b>per level/semester:</b> 26 / 13<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                        |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                        |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                        |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |
| <b>Prerequisites:</b> FMFI.KAMŠ/1-MAT-281/00 - Probability and Statistics (1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                        |
| <b>Course requirements:</b><br>Preliminary assessment: test<br>Examination: written examination<br>Approximate final assessment: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 30/70                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                        |
| <b>Learning outcomes:</b><br>After completing the course the student will master multivariate discrete and continuous distributions. He will be able to calculate distributions of sums, products and ratios of independent random variables. He will know the technique of characteristic functions and will be able to apply it to the multidimensional normal distribution. The knowledge of probability methods will be applied to selected statistical problems of parameter estimation and hypotheses testing.                                                                                                                        |                                                        |
| <b>Class syllabus:</b><br>Multiple random variables, their distribution and characteristics. Elementary introduction to Lebesgue integral. Marginal and conditional distributions and densities. Independence, sums of independent random variables. Characteristic functions and their applications. Convergence of sequences of random variables, central limit theorems and weak law of large numbers. Statistical inference: estimation of parameters, maximal likelihood estimates, hypothesis testing. Neyman Pearson lemma. Regression models: least squares and maximal likelihood estimation of parameters. Goodness of fit tests. |                                                        |
| <b>Recommended literature:</b><br>Janková, K., Pázman, A.: Pravdepodobnosť a štatistika, Vydavateľstvo UK 2011<br>K. Zvára, J. Štěpán: Pravděpodobnost a matematická statistika, Matfyzpress 1997<br>Harman, R., Honschová, E., Somorčík, J.: Zbierka úloh zo základov teórie pravdepodobnosti, Paci Bratislava 2009<br>G.R.Grimmett, D. Stirzaker: Probability and Random Processes. Oxford University Press 2001                                                                                                                                                                                                                          |                                                        |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                        |

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| <b>Notes:</b>                                                                                                                |       |       |       |       |      |
| <b>Past grade distribution</b>                                                                                               |       |       |       |       |      |
| Total number of evaluated students: 1312                                                                                     |       |       |       |       |      |
| A                                                                                                                            | B     | C     | D     | E     | FX   |
| 18,22                                                                                                                        | 10,75 | 15,24 | 20,35 | 27,82 | 7,62 |
| <b>Lecturers:</b> doc. RNDr. Katarína Janková, CSc., Mgr. Lívia Rosová, PhD., Ing. Assa Camara, Pál Somogyi, Mgr. Ján Veselý |       |       |       |       |      |
| <b>Last change:</b> 09.03.2022                                                                                               |       |       |       |       |      |
| <b>Approved by:</b>                                                                                                          |       |       |       |       |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                             |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                             |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                             |
| <b>Course ID:</b><br>FMFI.KAG/1-MAT-760/15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Course title:</b><br>Professional Graphical Software (1) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                             |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                             |
| <b>Recommended semester:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                             |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                             |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                             |
| <b>Antirequisites:</b> FMFI.KAGDM/1-MAT-760/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                             |
| <b>Course requirements:</b><br>For the semester, the student can get 100% for continuous assessment in the form of independent work on individual projects.<br>Evaluation: A (100-91), B (90-81), C (80-71), D (70-61), E (60-51), Fx (50-0).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                             |
| <b>Learning outcomes:</b><br>After completing the course, students will be able to create and edit complex bitmap or vector drawings and 3D models and their animations in multiplatform Open Source programs Gimp, Inkscape and Blender. Such images, drawings and possibly 3D models are often part of the final documents such as thesis.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                             |
| <b>Class syllabus:</b><br>1. Creating simple graphics, logos and animations using a graphics tablet in GIMP.<br>2. Advanced editing of photos (working with layers, masks, etc.) and scanned documents, overview of interesting extensions in Gimp.<br>3. Creating vector graphics using various tools in Inkscape.<br>4. Advanced tools (tile clones, filters, transformations) and the use of Inkscape extensions to create more complex vector artwork.<br>5. Creating simple 3D objects using standard tools. Setting up materials, lights, scenes, surroundings and cameras in Blender.<br>6. Use of spline surfaces and lattice deformation in the creation of 3D animal models.<br>7. Creating simple animations of a realistic-looking scene.<br>8. Creating an animated character using a skeleton and modifying the animation curves in Blender. |                                                             |
| <b>Recommended literature:</b><br>Josef Vybíral: GIMP – Praktická uživatelská příručka. Computer Press, 2008<br>Lubomír Čevela: Digitální fotografie v programu GIMP. Computer Press, 2012<br>Petr Šimčík: Inkscape – Praktický průvodce tvorbou vektorové grafiky. Computer Press, 2013<br>Dmitry Kirsanov: The Book of Inkscape (2nd Edition), No Starch Press, 2021<br>Tarmjong Bah: Inkscape – Guide to a Vector Drawing Program (4th Edition). Prentice Hall, 2011                                                                                                                                                                                                                                                                                                                                                                                    |                                                             |

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| Pavel Pokorný: Blender – Naučte se 3D grafiku. BEN - technická literatura, 2009<br>Jason van Gumster: Blender For Dummies (4th Edition). Wiley, 2020 |       |       |      |       |      |
| <b>Languages necessary to complete the course:</b>                                                                                                   |       |       |      |       |      |
| <b>Notes:</b>                                                                                                                                        |       |       |      |       |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 68                                                                             |       |       |      |       |      |
| A                                                                                                                                                    | B     | C     | D    | E     | FX   |
| 32,35                                                                                                                                                | 27,94 | 16,18 | 2,94 | 13,24 | 7,35 |
| <b>Lecturers:</b> RNDr. Róbert Bohdal, PhD.                                                                                                          |       |       |      |       |      |
| <b>Last change:</b> 24.06.2022                                                                                                                       |       |       |      |       |      |
| <b>Approved by:</b>                                                                                                                                  |       |       |      |       |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                             |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                             |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                             |
| <b>Course ID:</b><br>FMFI.KAG/1-MAT-830/15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Course title:</b><br>Professional Graphical Software (2) |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                             |
| <b>Number of credits:</b> 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                             |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                             |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                             |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                             |
| <b>Antirequisites:</b> FMFI.KAGDM/1-MAT-830/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                             |
| <b>Course requirements:</b><br>For the semester, the student can get 100% for continuous assessment in the form of independent work on individual projects.<br>Evaluation: A (100-91), B (90-81), C (80-71), D (70-61), E (60-51), Fx (50-0).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                             |
| <b>Learning outcomes:</b><br>After completing the course, students will be able to create realistic 3D models of characters and their animations (including facial expressions) in the Blender program. Furthermore, students will get acquainted with the technique of "motion tracking" and "green screen" combining animated 3D model and real video. Graduates of the course will be able to create realistic simulations of fire, water flow, explosion of fireworks and similar effects using particle systems.                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                             |
| <b>Class syllabus:</b> <ol style="list-style-type: none"> <li>1. Creation a realistic 3D human model using the MakeHuman plugin to import the model into Blender.</li> <li>2. Creation an animation of a walking or running 3D human model using a skeleton and transfer the created motion to another 3D model.</li> <li>3. Import of "motion capture" data containing the skeleton and human movement on your own 3D character model.</li> <li>4. Basics of "motion tracking" technique and its use for inserting an animated 3D model into a video (creation of visual effects).</li> <li>5. Replacing the virtual background with your own 3D scene or video using the green screen.</li> <li>6. Overview of particle systems, their use and possibilities.</li> <li>7. Creation of realistic fireworks.</li> <li>8. Simulation of combustion using particle systems.</li> <li>9. Realistic simulation of running water and other fluids.</li> </ol> |                                                             |
| <b>Recommended literature:</b><br>Pavel Pokorný: Blender – Naučte se 3D grafiku. BEN - technická literatura, 2009<br>Jason van Gumster: Blender For Dummies (4th Edition). Wiley, 2020                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                             |

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| Oliver Villar: Learning Blender. Pearson Education, 2020<br>Oscar Baechler, Xury Greer: Blender 3D By Example (2nd Edition). Packt Publishing, 2020<br>Beginner's Guide to Creating Characters in Blender. 3DTotal Publishing, 2021 |      |       |       |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                  |      |       |       |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                       |      |       |       |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 27                                                                                                                                                            |      |       |       |      |      |
| A                                                                                                                                                                                                                                   | B    | C     | D     | E    | FX   |
| 18,52                                                                                                                                                                                                                               | 7,41 | 25,93 | 33,33 | 7,41 | 7,41 |
| <b>Lecturers:</b> RNDr. Róbert Bohdal, PhD.                                                                                                                                                                                         |      |       |       |      |      |
| <b>Last change:</b> 24.06.2022                                                                                                                                                                                                      |      |       |       |      |      |
| <b>Approved by:</b>                                                                                                                                                                                                                 |      |       |       |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                             |      |                                         |      |      |       |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                           |      |                                         |      |      |       |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                             |      |                                         |      |      |       |
| <b>Course ID:</b><br>FMFI.KDMFI/1-MAT-130/14                                                                                                                                                                                |      | <b>Course title:</b><br>Programming (1) |      |      |       |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning    |      |                                         |      |      |       |
| <b>Number of credits:</b> 5                                                                                                                                                                                                 |      |                                         |      |      |       |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                             |      |                                         |      |      |       |
| <b>Educational level:</b> I.                                                                                                                                                                                                |      |                                         |      |      |       |
| <b>Prerequisites:</b>                                                                                                                                                                                                       |      |                                         |      |      |       |
| <b>Course requirements:</b>                                                                                                                                                                                                 |      |                                         |      |      |       |
| <b>Learning outcomes:</b><br>Students are able to solve problems algorithmically, to process large number of data and to communicate with the user using basic constructions and data types of programming language Python. |      |                                         |      |      |       |
| <b>Class syllabus:</b><br>Expressions and variables.<br>Loops.<br>Program branching.<br>Subroutines and functions.<br>List.<br>Solving mathematical and geometrical problems.<br>User interaction.                          |      |                                         |      |      |       |
| <b>Recommended literature:</b>                                                                                                                                                                                              |      |                                         |      |      |       |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                          |      |                                         |      |      |       |
| <b>Notes:</b>                                                                                                                                                                                                               |      |                                         |      |      |       |
| <b>Past grade distribution</b><br>Total number of evaluated students: 742                                                                                                                                                   |      |                                         |      |      |       |
| A                                                                                                                                                                                                                           | B    | C                                       | D    | E    | FX    |
| 50,81                                                                                                                                                                                                                       | 8,76 | 6,33                                    | 6,33 | 8,22 | 19,54 |
| <b>Lecturers:</b> doc. RNDr. Ľubomír Salanci, PhD., doc. RNDr. Ľudmila Jašková, PhD., Mgr. Mária Čujdíková, PhD.                                                                                                            |      |                                         |      |      |       |
| <b>Last change:</b> 05.11.2021                                                                                                                                                                                              |      |                                         |      |      |       |
| <b>Approved by:</b>                                                                                                                                                                                                         |      |                                         |      |      |       |

## COURSE DESCRIPTION

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------------------------------------|-------|-------|------|
| <b>Academic year:</b> 2021/2022                                                                                                                                                                                          |       |                                         |       |       |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                        |       |                                         |       |       |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                          |       |                                         |       |       |      |
| <b>Course ID:</b><br>FMFI.KDMFI/1-MAT-170/00                                                                                                                                                                             |       | <b>Course title:</b><br>Programming (2) |       |       |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning |       |                                         |       |       |      |
| <b>Number of credits:</b> 5                                                                                                                                                                                              |       |                                         |       |       |      |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                          |       |                                         |       |       |      |
| <b>Educational level:</b> I.                                                                                                                                                                                             |       |                                         |       |       |      |
| <b>Prerequisites:</b> FMFI.KDMFI/1-MAT-130/14 - Programming (1)                                                                                                                                                          |       |                                         |       |       |      |
| <b>Course requirements:</b>                                                                                                                                                                                              |       |                                         |       |       |      |
| <b>Learning outcomes:</b><br>Using object-oriented programming in the Python programming language, students are able to solve problems algorithmically, process structured data and interact with the user.              |       |                                         |       |       |      |
| <b>Class syllabus:</b><br>Strings.<br>Objects.<br>Many objects.<br>Turtle graphics.<br>Recursion.<br>Files,<br>Solving mathematical and geometrical problems.<br>User interaction.                                       |       |                                         |       |       |      |
| <b>Recommended literature:</b>                                                                                                                                                                                           |       |                                         |       |       |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                       |       |                                         |       |       |      |
| <b>Notes:</b>                                                                                                                                                                                                            |       |                                         |       |       |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 1768                                                                                                                                               |       |                                         |       |       |      |
| A                                                                                                                                                                                                                        | B     | C                                       | D     | E     | FX   |
| 34,28                                                                                                                                                                                                                    | 16,35 | 12,56                                   | 12,73 | 18,38 | 5,71 |
| <b>Lecturers:</b> doc. RNDr. Ľubomír Salanci, PhD.                                                                                                                                                                       |       |                                         |       |       |      |
| <b>Last change:</b> 30.11.2021                                                                                                                                                                                           |       |                                         |       |       |      |
| <b>Approved by:</b>                                                                                                                                                                                                      |       |                                         |       |       |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                  |       |                                         |      |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                |       |                                         |      |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                  |       |                                         |      |      |      |
| <b>Course ID:</b><br>FMFI.KDMFI/1-MAT-756/00                                                                                                                                                                                                                     |       | <b>Course title:</b><br>Programming (3) |      |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning                                         |       |                                         |      |      |      |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                      |       |                                         |      |      |      |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                  |       |                                         |      |      |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                     |       |                                         |      |      |      |
| <b>Prerequisites:</b> FMFI.KDMFI/1-MAT-170/00 - Programming (2)                                                                                                                                                                                                  |       |                                         |      |      |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 65/35                                                                                                                                                                                    |       |                                         |      |      |      |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                        |       |                                         |      |      |      |
| <b>Class syllabus:</b><br>Polymorphism<br>Data structures: hash table, queue, stack, linked list, tree, graph<br>Algorithms: concerning data structures, searching, sorting, backtracking<br>Thinking about complexity                                           |       |                                         |      |      |      |
| <b>Recommended literature:</b><br>Andrew Koenig, Barbara E. Moo: Rozumíme C++; Computer Press 2003<br>Miroslav Virius: Pasti a propasti jazyka C++; Grada 1997<br>Lectures are published on the internet: <a href="http://www.salanci.sk/c">www.salanci.sk/c</a> |       |                                         |      |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                               |       |                                         |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                    |       |                                         |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 63                                                                                                                                                                                         |       |                                         |      |      |      |
| A                                                                                                                                                                                                                                                                | B     | C                                       | D    | E    | FX   |
| 57,14                                                                                                                                                                                                                                                            | 14,29 | 9,52                                    | 4,76 | 9,52 | 4,76 |
| <b>Lecturers:</b> doc. RNDr. Ľubomír Salanci, PhD.                                                                                                                                                                                                               |       |                                         |      |      |      |
| <b>Last change:</b> 02.06.2015                                                                                                                                                                                                                                   |       |                                         |      |      |      |
| <b>Approved by:</b>                                                                                                                                                                                                                                              |       |                                         |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |                                                                                   |     |     |     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |     |                                                                                   |     |     |     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |                                                                                   |     |     |     |
| <b>Course ID:</b><br>FMFL.KTV/1-UXX-340/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     | <b>Course title:</b><br>Recreation Sports in Dialy Routine of Pupils and Students |     |     |     |
| <b>Educational activities:</b><br><b>Type of activities:</b> course<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |     |                                                                                   |     |     |     |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |     |                                                                                   |     |     |     |
| <b>Recommended semester:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |                                                                                   |     |     |     |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |     |                                                                                   |     |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |                                                                                   |     |     |     |
| <b>Course requirements:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |     |                                                                                   |     |     |     |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |                                                                                   |     |     |     |
| <b>Class syllabus:</b><br>To optimize the daily working programme of the students, the programmes of the sport recreational activities and time-off the students. The sport and health in a value orientation of the students. Using developed elemens in an education physical activity and sport preparation.<br>The programmes of the sport recreational activities as a basic precondition of health strengthening, acquirement of physical capability, fitness, regaining of working energy and readiness of body to confront stress situations and dangerous factors as a basic precondition of health strengthening, acquirement of physical capability, fitness, regaining of working energy and readiness of body to confront stress situations and dangerous factors. |     |                                                                                   |     |     |     |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |                                                                                   |     |     |     |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |     |                                                                                   |     |     |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |                                                                                   |     |     |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 44                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |     |                                                                                   |     |     |     |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | B   | C                                                                                 | D   | E   | FX  |
| 100,0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0,0 | 0,0                                                                               | 0,0 | 0,0 | 0,0 |
| <b>Lecturers:</b> Mgr. Tomáš Kuchár, PhD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |                                                                                   |     |     |     |
| <b>Last change:</b> 14.01.2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |                                                                                   |     |     |     |
| <b>Approved by:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |     |                                                                                   |     |     |     |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                         |       |                                              |      |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                       |       |                                              |      |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                         |       |                                              |      |      |      |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-161/00                                                                                                                                                                                                                                                                                                              |       | <b>Course title:</b><br>Russian Language (1) |      |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                   |       |                                              |      |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                             |       |                                              |      |      |      |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                         |       |                                              |      |      |      |
| <b>Educational level:</b> I., II.                                                                                                                                                                                                                                                                                                                       |       |                                              |      |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                   |       |                                              |      |      |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                           |       |                                              |      |      |      |
| <b>Learning outcomes:</b><br>Basic communication in Russian, developing other Russian language skills - listening comprehension, reading and writing.                                                                                                                                                                                                   |       |                                              |      |      |      |
| <b>Class syllabus:</b><br>To master the fundamentals of general Russian. The language level is A1.<br>Learning the Cyrillic (Russian) alphabet, gaining basic language competence, building up skills and confidence in dealing with unfamiliar authentic and semi-authentic texts.<br>The subject provides a course in Russian language for beginners. |       |                                              |      |      |      |
| <b>Recommended literature:</b><br>The textbook: : Точка Ру А1 (Ольга Долматова, Екатерина Новачац), pracovné karty Падежи 1 (Л.С. Безкоровайная, В.Е. Штыленко).                                                                                                                                                                                        |       |                                              |      |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                      |       |                                              |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                           |       |                                              |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 707                                                                                                                                                                                                                                                                               |       |                                              |      |      |      |
| A                                                                                                                                                                                                                                                                                                                                                       | B     | C                                            | D    | E    | FX   |
| 58,56                                                                                                                                                                                                                                                                                                                                                   | 16,55 | 11,03                                        | 4,38 | 1,84 | 7,64 |
| <b>Lecturers:</b> Viktoria Mirsalova                                                                                                                                                                                                                                                                                                                    |       |                                              |      |      |      |
| <b>Last change:</b> 20.06.2022                                                                                                                                                                                                                                                                                                                          |       |                                              |      |      |      |
| <b>Approved by:</b>                                                                                                                                                                                                                                                                                                                                     |       |                                              |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                        |       |                                              |     |      |     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                      |       |                                              |     |      |     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                        |       |                                              |     |      |     |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-162/00                                                                                                                                                                                                                                                                                                                             |       | <b>Course title:</b><br>Russian Language (2) |     |      |     |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                         |       |                                              |     |      |     |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                            |       |                                              |     |      |     |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                        |       |                                              |     |      |     |
| <b>Educational level:</b> I., II.                                                                                                                                                                                                                                                                                                                                      |       |                                              |     |      |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                  |       |                                              |     |      |     |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                          |       |                                              |     |      |     |
| <b>Learning outcomes:</b><br>Basic communication in Russian, developing other Russian language skills - listening comprehension, reading and writing.                                                                                                                                                                                                                  |       |                                              |     |      |     |
| <b>Class syllabus:</b><br>To master the fundamentals of general Russian.<br>Learning the Cyrillic (Russian) alphabet, gaining basic language competence, building up skills and confidence in dealing with unfamiliar authentic and semi-authentic texts.<br>The subject continues the program of Russian language (1) and provides a course of Russian for beginners. |       |                                              |     |      |     |
| <b>Recommended literature:</b><br>Textbook: Точка Ру А1 (Ольга Долматова, Екатерина Новачац), pracovné karty Падежи 1 (Л.С. Безкорвайная, В.Е. Штыленко).                                                                                                                                                                                                              |       |                                              |     |      |     |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                     |       |                                              |     |      |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                          |       |                                              |     |      |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 421                                                                                                                                                                                                                                                                                              |       |                                              |     |      |     |
| A                                                                                                                                                                                                                                                                                                                                                                      | B     | C                                            | D   | E    | FX  |
| 65,08                                                                                                                                                                                                                                                                                                                                                                  | 15,68 | 8,79                                         | 3,8 | 0,95 | 5,7 |
| <b>Lecturers:</b> Viktoria Mirsalova                                                                                                                                                                                                                                                                                                                                   |       |                                              |     |      |     |
| <b>Last change:</b> 20.06.2022                                                                                                                                                                                                                                                                                                                                         |       |                                              |     |      |     |
| <b>Approved by:</b>                                                                                                                                                                                                                                                                                                                                                    |       |                                              |     |      |     |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                           |      |                                              |     |     |     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                         |      |                                              |     |     |     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                           |      |                                              |     |     |     |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-261/00                                                                                                                                                                                                                                                                                                                                                                                                |      | <b>Course title:</b><br>Russian Language (3) |     |     |     |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                     |      |                                              |     |     |     |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                               |      |                                              |     |     |     |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                                                                                                                           |      |                                              |     |     |     |
| <b>Educational level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                                                                         |      |                                              |     |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                                              |     |     |     |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                             |      |                                              |     |     |     |
| <b>Learning outcomes:</b><br>Basic communication in Russian, developing other Russian language skills - listening comprehension, reading and writing.                                                                                                                                                                                                                                                                                     |      |                                              |     |     |     |
| <b>Class syllabus:</b><br>Learning the handwritten Russian (Russian Cursive Cyrillic), developing further language skills, gaining knowledge of Russian culture, history and way of life, pre-intermediate to intermediate grammar and vocabulary.<br>The course "Russian for Intermediate Students" is a follow-up to "Russian for Beginners". The subject of the course is general Russian in the range appropriate to the given level. |      |                                              |     |     |     |
| <b>Recommended literature:</b><br>Точка Ру А2 (Ольга Долматова, Екатерина Новачац) а Short Stories in Russian (Olly Richards, Alex Rowlings)                                                                                                                                                                                                                                                                                              |      |                                              |     |     |     |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                        |      |                                              |     |     |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                                              |     |     |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 200                                                                                                                                                                                                                                                                                                                                                                 |      |                                              |     |     |     |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                         | B    | C                                            | D   | E   | FX  |
| 70,5                                                                                                                                                                                                                                                                                                                                                                                                                                      | 17,5 | 8,5                                          | 2,5 | 0,0 | 1,0 |
| <b>Lecturers:</b> Viktoria Mirsalova                                                                                                                                                                                                                                                                                                                                                                                                      |      |                                              |     |     |     |
| <b>Last change:</b> 20.06.2022                                                                                                                                                                                                                                                                                                                                                                                                            |      |                                              |     |     |     |
| <b>Approved by:</b>                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                                              |     |     |     |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                              |      |      |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                         |       |                                              |      |      |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                           |       |                                              |      |      |      |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-262/00                                                                                                                                                                                                                                                                                                                                                                                                |       | <b>Course title:</b><br>Russian Language (4) |      |      |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                            |       |                                              |      |      |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                              |      |      |      |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                              |      |      |      |
| <b>Educational level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                              |      |      |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                              |      |      |      |
| <b>Course requirements:</b><br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                             |       |                                              |      |      |      |
| <b>Learning outcomes:</b><br>Learning the handwritten Russian (Russian Cursive Cyrillic), developing further language skills, gaining knowledge of Russian culture, history and way of life, pre-intermediate to intermediate grammar and vocabulary.                                                                                                                                                                                     |       |                                              |      |      |      |
| <b>Class syllabus:</b><br>Learning the handwritten Russian (Russian Cursive Cyrillic), developing further language skills, gaining knowledge of Russian culture, history and way of life, pre-intermediate to intermediate grammar and vocabulary.<br>The course "Russian for Intermediate Students" is a follow-up to "Russian for Beginners". The subject of the course is general Russian in the range appropriate to the given level. |       |                                              |      |      |      |
| <b>Recommended literature:</b><br>Точка Ру А2 (Ольга Долматова, Екатерина Новачац) а Short Stories in Russian (Olly Richards, Alex Rowlings)                                                                                                                                                                                                                                                                                              |       |                                              |      |      |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                        |       |                                              |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                              |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 144                                                                                                                                                                                                                                                                                                                                                                 |       |                                              |      |      |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                         | B     | C                                            | D    | E    | FX   |
| 75,69                                                                                                                                                                                                                                                                                                                                                                                                                                     | 13,19 | 6,94                                         | 2,78 | 0,69 | 0,69 |
| <b>Lecturers:</b> Viktoria Mirsalova                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                              |      |      |      |
| <b>Last change:</b> 20.06.2022                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                              |      |      |      |
| <b>Approved by:</b>                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                              |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                         |       |       |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                 |       |                                         |       |       |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                   |       |                                         |       |       |      |
| <b>Course ID:</b><br>FMFI.KAMŠ/1-PMA-760/00                                                                                                                                                                                                                                                                                                                                                                                       |       | <b>Course title:</b><br>Sampling Theory |       |       |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                |       |                                         |       |       |      |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                         |       |       |      |
| <b>Recommended semester:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                         |       |       |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                         |       |       |      |
| <b>Prerequisites:</b> FMFI.KAMŠ/1-MAT-282/00 - Probability and Statistics (2) or FMFI.KAMŠ/1-DAV-201/20 - Fundamentals of Probability and Statistics                                                                                                                                                                                                                                                                              |       |                                         |       |       |      |
| <b>Course requirements:</b><br>Preliminary semester evaluation: test<br>Final examination: written examination<br>Approximate grade thresholds: A 90%, B 80%, C 70%, D 60%, E 50%                                                                                                                                                                                                                                                 |       |                                         |       |       |      |
| <b>Learning outcomes:</b><br>The student will master basic sampling schemes used in sampling from a finite population. He will be able to find interval estimates for unknown population parameters.                                                                                                                                                                                                                              |       |                                         |       |       |      |
| <b>Class syllabus:</b><br>Simple random sampling, sampling without and with replacement. Estimate of population mean and proportion. Stratified random sampling. Stratification with proportional allocation. Optimum allocation, Neyman allocation. Systematic sampling. Elements of probabilistic random sampling. Inclusion probabilities, Horwitz-Thompson estimate and its properties. Bernoulli sampling, Poisson sampling. |       |                                         |       |       |      |
| <b>Recommended literature:</b><br>Kalas, J.: Vybrané kapitoly z teórie náhodného výberu, skriptá MFF UK Bratislava 1996.<br>Cochran, W.G. Sampling techniques, Wiley and Sons, New York,1977.<br>Särndal, C. E., Swensson, B., Wretman, J.: Model Assisted Survey Sampling, Springer 1992.                                                                                                                                        |       |                                         |       |       |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                |       |                                         |       |       |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                         |       |       |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 106                                                                                                                                                                                                                                                                                                                                                         |       |                                         |       |       |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                 | B     | C                                       | D     | E     | FX   |
| 29,25                                                                                                                                                                                                                                                                                                                                                                                                                             | 18,87 | 19,81                                   | 14,15 | 12,26 | 5,66 |
| <b>Lecturers:</b> doc. RNDr. Katarína Janková, CSc.                                                                                                                                                                                                                                                                                                                                                                               |       |                                         |       |       |      |

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| <b>Last change:</b> 26.11.2021 |
| <b>Approved by:</b>            |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                   |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                   |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                   |
| <b>Course ID:</b><br>FMFI.KAI/2-IKV a-192/19                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Course title:</b><br>Science, Technology and Humanity: Opportunities and Risks |
| <b>Educational activities:</b><br><b>Type of activities:</b> seminar<br><b>Number of hours:</b><br><b>per week: 3 per level/semester: 39</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                       |                                                                                   |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                   |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                   |
| <b>Educational level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                   |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                   |
| <b>Course requirements:</b><br>Semestral evaluation: active participation<br>Final evaluation: essay<br>Weight of the final evaluation: 60%<br>To achieve an A, 90% is needed, for B at least 80%, for C 70%, for D, 60% and for an E, at least 50% of overall assessment.                                                                                                                                                                                                                                        |                                                                                   |
| <b>Learning outcomes:</b><br>The students will gain awareness of the contemporary and potential future challenges posed by scientific and technological innovations and their impact on human behaviour, culture and society.                                                                                                                                                                                                                                                                                     |                                                                                   |
| <b>Class syllabus:</b><br>Big data: privacy, politics and power,<br>Internet of things, its usefulness and threats,<br>Assistant AI and its place in future society,<br>Job market and inequality,<br>Enhancements and human rights and the right to change self and others,<br>Initiatives for responsible research,<br>Artificial minds,<br>Hybridization between species and between AI and organic minds,<br>Future of minds and trans-humanism,<br>Artificial emotional intelligence,<br>An after human era. |                                                                                   |
| <b>Recommended literature:</b><br>- S. Russell: Human compatible. Artificial intelligence and the problem of control. Viking, 2019.<br>- J. Havens: Heartificial intelligence. Embracing our humanity to maximize machines. Penguin, 2016.<br>- P. Boddington: Towards a code of ethics for artificial intelligence. Springer, 2017.<br>- M. Shanahan: The technological singularity. MIT Press, 2015.                                                                                                            |                                                                                   |

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| <ul style="list-style-type: none"> <li>- C. MacKellar, C.: Cyborg Mind: What Brain–Computer and Mind–Cyberspace Interfaces Mean for Cyberneuroethics. Berghahn Books, 2019.</li> <li>- G. Bel, J. Gemmell: Total Recall, How the e-Memory Revolution will change everything. Dutton, 2009.</li> <li>- S. Zuboff: The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power. PublicAffairs, 2019.</li> <li>- C. O'Neil: Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy. Crown Publishers, 2016.</li> <li>- M. Tegmark: Life 3.0. Allen Lane, 2017.</li> </ul> |       |      |      |      |      |
| <b>Languages necessary to complete the course:</b><br>English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |      |      |      |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |      |      |      |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 48                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |      |      |      |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | B     | C    | D    | E    | FX   |
| 56,25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 18,75 | 6,25 | 6,25 | 6,25 | 6,25 |
| <b>Lecturers:</b> doc. RNDr. Martin Takáč, PhD., PhDr. Ing. Tomáš Gál, PhD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |      |      |      |      |
| <b>Last change:</b> 28.02.2020                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |      |      |      |      |
| <b>Approved by:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |      |      |      |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                    |       |                                              |      |     |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                  |       |                                              |      |     |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                    |       |                                              |      |     |      |
| <b>Course ID:</b><br>FMFI.KMANM/1-MAT-715/15                                                                                                                                                       |       | <b>Course title:</b><br>Seminar in MS-Office |      |     |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> seminar<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning |       |                                              |      |     |      |
| <b>Number of credits:</b> 2                                                                                                                                                                        |       |                                              |      |     |      |
| <b>Recommended semester:</b> 2.                                                                                                                                                                    |       |                                              |      |     |      |
| <b>Educational level:</b> I.                                                                                                                                                                       |       |                                              |      |     |      |
| <b>Prerequisites:</b>                                                                                                                                                                              |       |                                              |      |     |      |
| <b>Antirequisites:</b> FMFI.KMANM/1-MAT-715/00                                                                                                                                                     |       |                                              |      |     |      |
| <b>Course requirements:</b>                                                                                                                                                                        |       |                                              |      |     |      |
| <b>Learning outcomes:</b>                                                                                                                                                                          |       |                                              |      |     |      |
| <b>Class syllabus:</b>                                                                                                                                                                             |       |                                              |      |     |      |
| <b>Recommended literature:</b>                                                                                                                                                                     |       |                                              |      |     |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                 |       |                                              |      |     |      |
| <b>Notes:</b>                                                                                                                                                                                      |       |                                              |      |     |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 143                                                                                                                          |       |                                              |      |     |      |
| A                                                                                                                                                                                                  | B     | C                                            | D    | E   | FX   |
| 57,34                                                                                                                                                                                              | 15,38 | 6,99                                         | 6,99 | 4,9 | 8,39 |
| <b>Lecturers:</b> RNDr. Peter Švaňa, CSc.                                                                                                                                                          |       |                                              |      |     |      |
| <b>Last change:</b> 02.06.2015                                                                                                                                                                     |       |                                              |      |     |      |
| <b>Approved by:</b>                                                                                                                                                                                |       |                                              |      |     |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                        |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |
| <b>Course ID:</b><br>FMFI.KMANM/1-MAT-770/15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Course title:</b><br>Seminar in TEX |
| <b>Educational activities:</b><br><b>Type of activities:</b> seminar<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                               |                                        |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                        |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |
| <b>Antirequisites:</b> FMFI.KMANM/1-MAT-770/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        |
| <b>Course requirements:</b><br>Ongoing assessment: 10 individual tasks 5 points each<br>Exam: individual work, rewriting the specified text for 50 points<br>Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 50/50                                                                                                                                                                                                                                                    |                                        |
| <b>Learning outcomes:</b><br>Mastering the MikTeX or LaTeX compiler for writing professional texts. Introduction to editors for creating such texts.                                                                                                                                                                                                                                                                                                                                                                             |                                        |
| <b>Class syllabus:</b> <ol style="list-style-type: none"> <li>1. Visualization of a tex file, error messages</li> <li>2. Basic structure of a tex file, commands and environments, organization of different types of documents</li> <li>3. Styles and font sizes, tables writing, footnotes</li> <li>4. Mathematical formulas, creating simple pictures and inserting external pictures</li> <li>5. Literature writing, index creation, slides</li> <li>6. Creation of special documents (presentation, letter, ...)</li> </ol> |                                        |
| <b>Recommended literature:</b><br>Teacher's own electronic texts published through web documents.                                                                                                                                                                                                                                                                                                                                                                                                                                |                                        |
| <b>Languages necessary to complete the course:</b><br>Slovak, English                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                        |

|                                               |     |      |      |     |      |
|-----------------------------------------------|-----|------|------|-----|------|
| <b>Past grade distribution</b>                |     |      |      |     |      |
| Total number of evaluated students: 415       |     |      |      |     |      |
| A                                             | B   | C    | D    | E   | FX   |
| 84,34                                         | 5,3 | 3,61 | 1,69 | 1,2 | 3,86 |
| <b>Lecturers:</b> RNDr. Michal Pospíšil, PhD. |     |      |      |     |      |
| <b>Last change:</b> 17.06.2022                |     |      |      |     |      |
| <b>Approved by:</b>                           |     |      |      |     |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                               |     |     |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                                               |     |     |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                               |     |     |      |
| <b>Course ID:</b><br>FMFI.KAG/1-MAT-455/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       | <b>Course title:</b><br>Set Theory and Mathematical Logic (1) |     |     |      |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                            |       |                                                               |     |     |      |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                               |     |     |      |
| <b>Recommended semester:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                               |     |     |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                               |     |     |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                                               |     |     |      |
| <b>Course requirements:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                               |     |     |      |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                                               |     |     |      |
| <b>Class syllabus:</b><br>Propositional calculus, propositional forms, provability, interpretations, tautologies, the completeness theorem.<br>Boolean algebras and filters and their relation to propositional calculus.<br>First order languages and structures. Terms, formulas and first order theories. Satisfaction of formulas, models of theories. Provability and the deduction theorem. Consistent, complete and Henkin theories. Gödel's completeness theorem. The compactness theorem and its consequences. Examples of theories. |       |                                                               |     |     |      |
| <b>Recommended literature:</b><br>J. Shoenfield: Mathematical Logic, Adison-Wesley, Reading, 1967.<br>P. Štěpánek: Matematická logika, SPN, Prague, 1982.<br>A. Sochor: Klasická matematická logika, Karolinum, Prague, 2001.                                                                                                                                                                                                                                                                                                                 |       |                                                               |     |     |      |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                                               |     |     |      |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                                               |     |     |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 80                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                                               |     |     |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | B     | C                                                             | D   | E   | FX   |
| 63,75                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 21,25 | 11,25                                                         | 2,5 | 0,0 | 1,25 |
| <b>Lecturers:</b> prof. RNDr. Pavol Zlatoš, PhD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                                               |     |     |      |
| <b>Last change:</b> 02.06.2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                                               |     |     |      |
| <b>Approved by:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                                               |     |     |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                               |      |     |     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                                               |      |     |     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                               |      |     |     |
| <b>Course ID:</b><br>FMFI.KAG/1-MAT-480/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       | <b>Course title:</b><br>Set Theory and Mathematical Logic (2) |      |     |     |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                               |      |     |     |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                                               |      |     |     |
| <b>Recommended semester:</b> 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                               |      |     |     |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                                               |      |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                                               |      |     |     |
| <b>Course requirements:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                                               |      |     |     |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                                               |      |     |     |
| <b>Class syllabus:</b><br>Substructures, homomorphisms and chains of structures. Elementary equivalence, elementary substructures and elementary chains. Tarski's criterion. Diagrams. Axiomatic and finitely axiomatizable classes. Universal, existential, universal-existential and positive formulas. Preservation of theories under algebraic constructions.<br>Filtered product, ultraproduct and ultrapower. Los' theorem. The compactnes theorem in the language of ultraproducts. Characterization of elementary equivalence and (finitely) axiomatizable classes.<br>The axiom of choice, the well-ordering priciple and maximality principles. Transfinite induction. |       |                                                               |      |     |     |
| <b>Recommended literature:</b><br>H. J. Keisler, C.C. Chang: Model Theory, North-Holland, Amsterdam, 1973.<br>P. Štěpánek: Matematická logika, SPN, Prague, 1982<br>B. Balcar, P. Štěpánek: Teorie množín, Academia, Prague, 1986.                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                               |      |     |     |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                               |      |     |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                                               |      |     |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 38                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                                               |      |     |     |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | B     | C                                                             | D    | E   | FX  |
| 65,79                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 21,05 | 10,53                                                         | 2,63 | 0,0 | 0,0 |
| <b>Lecturers:</b> prof. RNDr. Pavol Zlatoš, PhD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                                               |      |     |     |
| <b>Last change:</b> 02.06.2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                               |      |     |     |
| <b>Approved by:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                                               |      |     |     |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                  |     |                                                                  |     |     |       |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                |     |                                                                  |     |     |       |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                  |     |                                                                  |     |     |       |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-171/20                                                                                                                                                                                                                                                                                                                                                                       |     | <b>Course title:</b><br>Slovak Language for Foreign Students (1) |     |     |       |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                   |     |                                                                  |     |     |       |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                      |     |                                                                  |     |     |       |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                  |     |                                                                  |     |     |       |
| <b>Educational level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                                                |     |                                                                  |     |     |       |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                            |     |                                                                  |     |     |       |
| <b>Course requirements:</b><br>tests<br>Course prerequisites:<br><a href="https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezhneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/">https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezhneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/</a><br>Scale of assessment (preliminary/final): 100/0 |     |                                                                  |     |     |       |
| <b>Learning outcomes:</b><br>This course is aimed for foreign students to learn the fundamentals of the Slovak language with the focus on basic communication as well as all other language skills- listening comprehension,reading and writing.                                                                                                                                                                 |     |                                                                  |     |     |       |
| <b>Class syllabus:</b><br>The syllabus is targeted at the comprehension of the basics of the Slovak language for the absolute beginners (A1).                                                                                                                                                                                                                                                                    |     |                                                                  |     |     |       |
| <b>Recommended literature:</b><br>Križom- Krážom Slovenčina 1, additional material to further support the covered topics.                                                                                                                                                                                                                                                                                        |     |                                                                  |     |     |       |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                               |     |                                                                  |     |     |       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                    |     |                                                                  |     |     |       |
| <b>Past grade distribution</b><br>Total number of evaluated students: 23                                                                                                                                                                                                                                                                                                                                         |     |                                                                  |     |     |       |
| A                                                                                                                                                                                                                                                                                                                                                                                                                | B   | C                                                                | D   | E   | FX    |
| 47,83                                                                                                                                                                                                                                                                                                                                                                                                            | 0,0 | 0,0                                                              | 0,0 | 0,0 | 52,17 |
| <b>Lecturers:</b> Mgr. Aneta Barnes                                                                                                                                                                                                                                                                                                                                                                              |     |                                                                  |     |     |       |
| <b>Last change:</b> 21.06.2022                                                                                                                                                                                                                                                                                                                                                                                   |     |                                                                  |     |     |       |
| <b>Approved by:</b>                                                                                                                                                                                                                                                                                                                                                                                              |     |                                                                  |     |     |       |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                |     |                                                                  |     |     |       |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                              |     |                                                                  |     |     |       |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                |     |                                                                  |     |     |       |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-172/20                                                                                                                                                                                                                                                                                                                                                                     |     | <b>Course title:</b><br>Slovak Language for Foreign Students (2) |     |     |       |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                 |     |                                                                  |     |     |       |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                    |     |                                                                  |     |     |       |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                |     |                                                                  |     |     |       |
| <b>Educational level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                                              |     |                                                                  |     |     |       |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                          |     |                                                                  |     |     |       |
| <b>Course requirements:</b><br>tests<br>Course prerequisites:<br><a href="https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebežneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/">https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebežneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/</a><br>Scale of assessment (preliminary/final): 100/0 |     |                                                                  |     |     |       |
| <b>Learning outcomes:</b><br>This course is aimed for foreign students to learn the fundamentals of the Slovak language with the focus on basic communication as well as all other language skills- listening comprehension,reading and writing.                                                                                                                                                               |     |                                                                  |     |     |       |
| <b>Class syllabus:</b><br>The syllabus is targeted at the comprehension of the basics of the Slovak language for the absolute beginners (A1) and this course is a follow up course to the Slovak language course 1.                                                                                                                                                                                            |     |                                                                  |     |     |       |
| <b>Recommended literature:</b><br>Križom- Krážom Slovenčina 1, additional material to further support the covered topics                                                                                                                                                                                                                                                                                       |     |                                                                  |     |     |       |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                             |     |                                                                  |     |     |       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                  |     |                                                                  |     |     |       |
| <b>Past grade distribution</b><br>Total number of evaluated students: 22                                                                                                                                                                                                                                                                                                                                       |     |                                                                  |     |     |       |
| A                                                                                                                                                                                                                                                                                                                                                                                                              | B   | C                                                                | D   | E   | FX    |
| 81,82                                                                                                                                                                                                                                                                                                                                                                                                          | 0,0 | 4,55                                                             | 0,0 | 0,0 | 13,64 |
| <b>Lecturers:</b> Mgr. Aneta Barnes                                                                                                                                                                                                                                                                                                                                                                            |     |                                                                  |     |     |       |
| <b>Last change:</b> 21.06.2022                                                                                                                                                                                                                                                                                                                                                                                 |     |                                                                  |     |     |       |
| <b>Approved by:</b>                                                                                                                                                                                                                                                                                                                                                                                            |     |                                                                  |     |     |       |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                |     |                                                                  |     |     |     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                              |     |                                                                  |     |     |     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                |     |                                                                  |     |     |     |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-271/20                                                                                                                                                                                                                                                                                                                                                                     |     | <b>Course title:</b><br>Slovak Language for Foreign Students (3) |     |     |     |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                 |     |                                                                  |     |     |     |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                    |     |                                                                  |     |     |     |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                                                                                                |     |                                                                  |     |     |     |
| <b>Educational level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                                              |     |                                                                  |     |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                          |     |                                                                  |     |     |     |
| <b>Course requirements:</b><br>tests<br>Course prerequisites:<br><a href="https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebežneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/">https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebežneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/</a><br>Scale of assessment (preliminary/final): 100/0 |     |                                                                  |     |     |     |
| <b>Learning outcomes:</b><br>This course is aimed for foreign students to better comprehend all the language skills important to enable correct usage of the Slovak language – listening comprehension, reading, writing and speaking.                                                                                                                                                                         |     |                                                                  |     |     |     |
| <b>Class syllabus:</b><br>The syllabus is targeted at the comprehension of all the language skills of the Slovak language , and it is a follow up course to the Slovak language course 2.                                                                                                                                                                                                                      |     |                                                                  |     |     |     |
| <b>Recommended literature:</b><br>Križom-Krážom Slovenčina 2, additional material to further support the covered topics.                                                                                                                                                                                                                                                                                       |     |                                                                  |     |     |     |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                             |     |                                                                  |     |     |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                  |     |                                                                  |     |     |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 8                                                                                                                                                                                                                                                                                                                                        |     |                                                                  |     |     |     |
| A                                                                                                                                                                                                                                                                                                                                                                                                              | B   | C                                                                | D   | E   | FX  |
| 100,0                                                                                                                                                                                                                                                                                                                                                                                                          | 0,0 | 0,0                                                              | 0,0 | 0,0 | 0,0 |
| <b>Lecturers:</b> Mgr. Aneta Barnes                                                                                                                                                                                                                                                                                                                                                                            |     |                                                                  |     |     |     |
| <b>Last change:</b> 21.06.2022                                                                                                                                                                                                                                                                                                                                                                                 |     |                                                                  |     |     |     |
| <b>Approved by:</b>                                                                                                                                                                                                                                                                                                                                                                                            |     |                                                                  |     |     |     |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                |     |                                                                  |     |     |     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                              |     |                                                                  |     |     |     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                |     |                                                                  |     |     |     |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-272/20                                                                                                                                                                                                                                                                                                                                                                     |     | <b>Course title:</b><br>Slovak Language for Foreign Students (4) |     |     |     |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week: 2 per level/semester: 26</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                 |     |                                                                  |     |     |     |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                    |     |                                                                  |     |     |     |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                |     |                                                                  |     |     |     |
| <b>Educational level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                                              |     |                                                                  |     |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                          |     |                                                                  |     |     |     |
| <b>Course requirements:</b><br>tests<br>Course prerequisites:<br><a href="https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebežneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/">https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebežneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/</a><br>Scale of assessment (preliminary/final): 100/0 |     |                                                                  |     |     |     |
| <b>Learning outcomes:</b><br>This course is aimed for foreign students to better comprehend all the language skills important to enable correct usage of the Slovak language – listening comprehension, reading, writing and speaking.                                                                                                                                                                         |     |                                                                  |     |     |     |
| <b>Class syllabus:</b><br>The syllabus is targeted at the comprehension of all the language skills of the Slovak language , and it is a follow up course to the Slovak language course 3.                                                                                                                                                                                                                      |     |                                                                  |     |     |     |
| <b>Recommended literature:</b><br>Križom-Krážom Slovenčina 2, additional material to further support the covered topics.                                                                                                                                                                                                                                                                                       |     |                                                                  |     |     |     |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                             |     |                                                                  |     |     |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                  |     |                                                                  |     |     |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 7                                                                                                                                                                                                                                                                                                                                        |     |                                                                  |     |     |     |
| A                                                                                                                                                                                                                                                                                                                                                                                                              | B   | C                                                                | D   | E   | FX  |
| 100,0                                                                                                                                                                                                                                                                                                                                                                                                          | 0,0 | 0,0                                                              | 0,0 | 0,0 | 0,0 |
| <b>Lecturers:</b> Mgr. Aneta Barnes                                                                                                                                                                                                                                                                                                                                                                            |     |                                                                  |     |     |     |
| <b>Last change:</b> 21.06.2022                                                                                                                                                                                                                                                                                                                                                                                 |     |                                                                  |     |     |     |
| <b>Approved by:</b>                                                                                                                                                                                                                                                                                                                                                                                            |     |                                                                  |     |     |     |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                             |                                         |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                           |                                         |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                             |                                         |
| <b>Course ID:</b><br>FMFI.KMANM/1-<br>MAT-733/19                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Course title:</b><br>Software MATLAB |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                       |                                         |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                         |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                                                                                                                                             |                                         |
| <b>Educational level:</b> I., II.                                                                                                                                                                                                                                                                                                                                                                                                                           |                                         |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                         |
| <b>Antirequisites:</b> FMFI.KMANM/1-MAT-731/00 and FMFI.KMANM/1-MAT-732/00                                                                                                                                                                                                                                                                                                                                                                                  |                                         |
| <b>Course requirements:</b><br>Continuous assessment: activity<br>Examination: group project, practical computer exam<br>Scale of assessment (preliminary/final): 20/80                                                                                                                                                                                                                                                                                     |                                         |
| <b>Learning outcomes:</b><br>Students will learn the basics of using MATLAB software. They will be able to use MATLAB to calculate some mathematical problems, read files or write to files, plot computed data, create complex functions for reuse and create a graphical user interface GUI for their programs.                                                                                                                                           |                                         |
| <b>Class syllabus:</b><br>Format and conversion of variables, vectors and matrices<br>Programming environment, so-called M-file<br>Reading from a file and plotting data<br>Creating functions<br>Graphical GUI environment                                                                                                                                                                                                                                 |                                         |
| <b>Recommended literature:</b><br>MATLAB - SIMULINK I / Stefan Kozak, Slavomir Kajan. Bratislava: Slovak University of Technology, 1999 Matlab / Jela Babušíková. Bratislava: FMFI UK Library and Publishing Center, 2007<br>Kozák Š., Kajan S., Matlab - Simulink, 1. Slovak University of Technology in Bratislava, 1999. ISBN Dušek F., MatLab and Simulink, University of Pardubice, 2000<br><a href="http://mathworks.com/help">mathworks.com/help</a> |                                         |
| <b>Languages necessary to complete the course:</b><br>slovak                                                                                                                                                                                                                                                                                                                                                                                                |                                         |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                         |

|                                             |      |       |       |       |       |
|---------------------------------------------|------|-------|-------|-------|-------|
| <b>Past grade distribution</b>              |      |       |       |       |       |
| Total number of evaluated students: 52      |      |       |       |       |       |
| A                                           | B    | C     | D     | E     | FX    |
| 19,23                                       | 25,0 | 13,46 | 15,38 | 11,54 | 15,38 |
| <b>Lecturers:</b> RNDr. Patrik Mihala, PhD. |      |       |       |       |       |
| <b>Last change:</b> 15.03.2022              |      |       |       |       |       |
| <b>Approved by:</b>                         |      |       |       |       |       |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                               |     |                                              |     |     |     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                             |     |                                              |     |     |     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                               |     |                                              |     |     |     |
| <b>Course ID:</b><br>FMFL.KTV/1-MXX-115/15                                                                                                                                                                                                                                                                                                                                                                                    |     | <b>Course title:</b><br>Sports in Nature (1) |     |     |     |
| <b>Educational activities:</b><br><b>Type of activities:</b><br><b>Number of hours:</b><br><b>per week: per level/semester:</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                |     |                                              |     |     |     |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                   |     |                                              |     |     |     |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                               |     |                                              |     |     |     |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                  |     |                                              |     |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                         |     |                                              |     |     |     |
| <b>Course requirements:</b><br>Grades: A 90%, B 80%, C 70%, D 60%, E 50%.<br>The condition for the award of 1 or 2 credits is the completion of a multi-day course in its full scope, or the completion of one-day courses in the scope of 4 days. Candidates can apply to the leaders of individual courses. From the presented offer of courses, you can choose the one that suits your interests, abilities and deadlines. |     |                                              |     |     |     |
| <b>Learning outcomes:</b><br>Acquisition and development of basic motor skills and abilities in selected sports: skiing and snowboarding. Mastering the correct technique of performing individual movements, which are necessary for skiing and snowboarding.                                                                                                                                                                |     |                                              |     |     |     |
| <b>Class syllabus:</b><br>The student can sign up for the outdoor sports courses offered by the department: skiing, snowboarding and other hobby sports. The lessons in the courses are focused on the development of basic and special movement skills and, mastering the techniques needed for the sports.                                                                                                                  |     |                                              |     |     |     |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                                                                                                                                                |     |                                              |     |     |     |
| <b>Languages necessary to complete the course:</b><br>Slovak                                                                                                                                                                                                                                                                                                                                                                  |     |                                              |     |     |     |
| <b>Notes:</b><br>KTVŠ does not rent ski equipment.                                                                                                                                                                                                                                                                                                                                                                            |     |                                              |     |     |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 227                                                                                                                                                                                                                                                                                                                                                     |     |                                              |     |     |     |
| A                                                                                                                                                                                                                                                                                                                                                                                                                             | B   | C                                            | D   | E   | FX  |
| 99,56                                                                                                                                                                                                                                                                                                                                                                                                                         | 0,0 | 0,44                                         | 0,0 | 0,0 | 0,0 |
| <b>Lecturers:</b> Mgr. Martin Dovičák, PhD., Mgr. Tomáš Kuchár, PhD., Mgr. Jana Leginusová, PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, PaedDr. Mikuláš Ortutay, Mgr. Júlia Raábová, PhD.                                                                                                                                                                                                                                    |     |                                              |     |     |     |

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| <b>Last change:</b> 16.06.2022 |
| <b>Approved by:</b>            |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                              |     |                                              |     |     |      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                            |     |                                              |     |     |      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                              |     |                                              |     |     |      |
| <b>Course ID:</b><br>FMFL.KTV/1-MXX-215/15                                                                                                                                                                                                                                                                                                                                                                                   |     | <b>Course title:</b><br>Sports in Nature (2) |     |     |      |
| <b>Educational activities:</b><br><b>Type of activities:</b><br><b>Number of hours:</b><br><b>per week:</b> <b>per level/semester:</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                        |     |                                              |     |     |      |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                  |     |                                              |     |     |      |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                              |     |                                              |     |     |      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                 |     |                                              |     |     |      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                        |     |                                              |     |     |      |
| <b>Course requirements:</b><br>Grades: A 90%, B 80%, C 70%, D 60%, E 50%<br>The condition for the award of 1 or 2 credits is the completion of a multi-day course in its full scope, or the completion of one-day courses in the scope of 4 days. Candidates can apply to the leaders of individual courses. From the presented offer of courses, you can choose the one that suits your interests, abilities and deadlines. |     |                                              |     |     |      |
| <b>Learning outcomes:</b><br>Creating a positive and lasting relationship with physical activity. Acquisition and mastery of basic motor skills and abilities in outdoor sports: windsurfing, beach volleyball, water tourism - river rafting, hiking and other sports according to interest. Training and improving the technique needed for the sports.                                                                    |     |                                              |     |     |      |
| <b>Class syllabus:</b><br>The student can sign up for the outdoor sports courses offered by the department: water tourism - river rafting, windsurfing, beach volleyball, hiking and other hobby sports. The lessons in the courses are focused on the development of basic and special movement skills and, mastering the techniques needed for the sports.                                                                 |     |                                              |     |     |      |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                                                                                                                                               |     |                                              |     |     |      |
| <b>Languages necessary to complete the course:</b><br>Slovak                                                                                                                                                                                                                                                                                                                                                                 |     |                                              |     |     |      |
| <b>Notes:</b><br>KTVŠ will provide sports equipment.                                                                                                                                                                                                                                                                                                                                                                         |     |                                              |     |     |      |
| <b>Past grade distribution</b><br>Total number of evaluated students: 194                                                                                                                                                                                                                                                                                                                                                    |     |                                              |     |     |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                            | B   | C                                            | D   | E   | FX   |
| 94,33                                                                                                                                                                                                                                                                                                                                                                                                                        | 0,0 | 0,0                                          | 0,0 | 0,0 | 5,67 |

|                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lecturers:</b> Mgr. Martin Dovičák, PhD., Mgr. Tomáš Kuchár, PhD., Mgr. Jana Leginusová, PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, PaedDr. Mikuláš Ortutay, Mgr. Júlia Raábová, PhD. |
| <b>Last change:</b> 16.06.2022                                                                                                                                                             |
| <b>Approved by:</b>                                                                                                                                                                        |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                              |     |                                              |     |     |     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                            |     |                                              |     |     |     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                              |     |                                              |     |     |     |
| <b>Course ID:</b><br>FMFI.KTV/1-MXX-216/18                                                                                                                                                                                                                                                                                                                                                                                   |     | <b>Course title:</b><br>Sports in Nature (3) |     |     |     |
| <b>Educational activities:</b><br><b>Type of activities:</b><br><b>Number of hours:</b><br><b>per week: per level/semester:</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                               |     |                                              |     |     |     |
| <b>Number of credits:</b> 1                                                                                                                                                                                                                                                                                                                                                                                                  |     |                                              |     |     |     |
| <b>Recommended semester:</b> 3.                                                                                                                                                                                                                                                                                                                                                                                              |     |                                              |     |     |     |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                 |     |                                              |     |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                        |     |                                              |     |     |     |
| <b>Antirequisites:</b> FMFI.KTV/1-UXX-151/22                                                                                                                                                                                                                                                                                                                                                                                 |     |                                              |     |     |     |
| <b>Course requirements:</b><br>Grades: A 90%, B 80%, C 70%, D 60%, E 50%<br>The condition for the award of 1 or 2 credits is the completion of a multi-day course in its full scope, or the completion of one-day courses in the scope of 4 days. Candidates can apply to the leaders of individual courses. From the presented offer of courses, you can choose the one that suits your interests, abilities and deadlines. |     |                                              |     |     |     |
| <b>Learning outcomes:</b><br>Acquisition and development of basic motor skills and abilities in selected sports: skiing and snowboarding. Mastering the correct technique of performing individual movements, which are necessary for skiing and snowboarding.                                                                                                                                                               |     |                                              |     |     |     |
| <b>Class syllabus:</b><br>The student can sign up for the outdoor sports courses offered by the department: skiing, snowboarding. The lessons in the courses are focused on the development of basic and special movement skills and, mastering the techniques needed for the sports.                                                                                                                                        |     |                                              |     |     |     |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                                                                                                                                               |     |                                              |     |     |     |
| <b>Languages necessary to complete the course:</b><br>Slovak                                                                                                                                                                                                                                                                                                                                                                 |     |                                              |     |     |     |
| <b>Notes:</b><br>KTVŠ does not rent ski equipment.                                                                                                                                                                                                                                                                                                                                                                           |     |                                              |     |     |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 19                                                                                                                                                                                                                                                                                                                                                     |     |                                              |     |     |     |
| A                                                                                                                                                                                                                                                                                                                                                                                                                            | B   | C                                            | D   | E   | FX  |
| 100,0                                                                                                                                                                                                                                                                                                                                                                                                                        | 0,0 | 0,0                                          | 0,0 | 0,0 | 0,0 |

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| <b>Lecturers:</b> Mgr. Martin Dovičák, PhD., Mgr. Tomáš Kuchár, PhD., Mgr. Jana Leginusová, PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, PaedDr. Mikuláš Ortutay, Mgr. Júlia Raábová, PhD. |
| <b>Last change:</b> 16.06.2022                                                                                                                                                             |
| <b>Approved by:</b>                                                                                                                                                                        |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                              |     |                                              |     |     |       |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                            |     |                                              |     |     |       |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                              |     |                                              |     |     |       |
| <b>Course ID:</b><br>FMFI.KTV/1-MXX-217/18                                                                                                                                                                                                                                                                                                                                                                                   |     | <b>Course title:</b><br>Sports in Nature (4) |     |     |       |
| <b>Educational activities:</b><br><b>Type of activities:</b><br><b>Number of hours:</b><br><b>per week: per level/semester:</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                               |     |                                              |     |     |       |
| <b>Number of credits:</b> 1                                                                                                                                                                                                                                                                                                                                                                                                  |     |                                              |     |     |       |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                              |     |                                              |     |     |       |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                 |     |                                              |     |     |       |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                        |     |                                              |     |     |       |
| <b>Antirequisites:</b> FMFI.KTV/1-UXX-152/22                                                                                                                                                                                                                                                                                                                                                                                 |     |                                              |     |     |       |
| <b>Course requirements:</b><br>Grades: A 90%, B 80%, C 70%, D 60%, E 50%<br>The condition for the award of 1 or 2 credits is the completion of a multi-day course in its full scope, or the completion of one-day courses in the scope of 4 days. Candidates can apply to the leaders of individual courses. From the presented offer of courses, you can choose the one that suits your interests, abilities and deadlines. |     |                                              |     |     |       |
| <b>Learning outcomes:</b><br>Creating a positive and lasting relationship with physical activity. Acquisition and mastery of basic motor skills and abilities in outdoor sports: windsurfing, beach volleyball, water tourism - river rafting, hiking and other sports according to interest. Training and improving the technique needed for the sports.                                                                    |     |                                              |     |     |       |
| <b>Class syllabus:</b><br>The student can sign up for the outdoor sports courses offered by the department: water tourism - river rafting, windsurfing, beach volleyball, hiking and other hobby sports. The lessons in the courses are focused on the development of basic and special movement skills and, mastering the techniques needed for the sports.                                                                 |     |                                              |     |     |       |
| <b>Recommended literature:</b>                                                                                                                                                                                                                                                                                                                                                                                               |     |                                              |     |     |       |
| <b>Languages necessary to complete the course:</b><br>Slovak                                                                                                                                                                                                                                                                                                                                                                 |     |                                              |     |     |       |
| <b>Notes:</b><br>KTVŠ will provide material equipment.                                                                                                                                                                                                                                                                                                                                                                       |     |                                              |     |     |       |
| <b>Past grade distribution</b><br>Total number of evaluated students: 18                                                                                                                                                                                                                                                                                                                                                     |     |                                              |     |     |       |
| A                                                                                                                                                                                                                                                                                                                                                                                                                            | B   | C                                            | D   | E   | FX    |
| 88,89                                                                                                                                                                                                                                                                                                                                                                                                                        | 0,0 | 0,0                                          | 0,0 | 0,0 | 11,11 |

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| <b>Lecturers:</b> Mgr. Martin Dovičák, PhD., Mgr. Tomáš Kuchár, PhD., Mgr. Jana Leginusová, PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, PaedDr. Mikuláš Ortutay, Mgr. Júlia Raábová, PhD. |
| <b>Last change:</b> 16.06.2022                                                                                                                                                             |
| <b>Approved by:</b>                                                                                                                                                                        |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                                                          |     |     |     |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |                                                          |     |     |     |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                                                          |     |     |     |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-133/18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      | <b>Course title:</b><br>Supplementary English Course (1) |     |     |     |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                                                          |     |     |     |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                                                          |     |     |     |
| <b>Recommended semester:</b> 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                                                          |     |     |     |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                                                          |     |     |     |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                                                          |     |     |     |
| <b>Course requirements:</b><br>tests, homework<br>Scale of assessment (preliminary/final): 100/0 credit - ongoing evaluation<br>Minimum 65 percent of the total points for the assigned work is needed to pass the course. Points can be awarded for attendance, completed homework tasks, and short tests assigned during the course.<br>A 100-93 %<br>B 92-85 %<br>C 84-77 %<br>D 76-70 %<br>E 69-65 %<br>Course prerequisites: <a href="https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezhneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/">https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezhneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/</a> |      |                                                          |     |     |     |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                                                          |     |     |     |
| <b>Class syllabus:</b><br>Texts dealing with the most important topics for FMPI majors combining grammar revision with vocabulary needed to pass the A4 English exam.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                                                          |     |     |     |
| <b>Recommended literature:</b><br>Study materials are created by the teacher and available in electronic form.<br>Raymond Murphy: Essential Grammar in Use, Cambridge University Press, 1998<br>Michael McCarthy, Felicity O'Dell: English Vocabulary in Use, Cambridge University Press, 1994                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |                                                          |     |     |     |
| <b>Languages necessary to complete the course:</b><br>English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |                                                          |     |     |     |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |                                                          |     |     |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                                                          |     |     |     |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | B    | C                                                        | D   | E   | FX  |
| 52,0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 24,0 | 8,0                                                      | 0,0 | 8,0 | 8,0 |
| <b>Lecturers:</b> Mgr. Ing. Jana Kočvarová                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |                                                          |     |     |     |

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| <b>Last change:</b> 17.06.2022 |
| <b>Approved by:</b>            |

## COURSE DESCRIPTION

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------------------------------------------|-------|------|-------|
| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                                          |       |      |       |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                                          |       |      |       |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                                          |       |      |       |
| <b>Course ID:</b><br>FMFI.KJP/1-MXX-134/18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       | <b>Course title:</b><br>Supplementary English Course (2) |       |      |       |
| <b>Educational activities:</b><br><b>Type of activities:</b> practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 <b>per level/semester:</b> 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                                          |       |      |       |
| <b>Number of credits:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                                          |       |      |       |
| <b>Recommended semester:</b> 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                                          |       |      |       |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                                          |       |      |       |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                                          |       |      |       |
| <b>Course requirements:</b><br>tests, homework<br>Scale of assessment (preliminary/final): 100/0 ENcredit - ongoing evaluation Minimum 65 percent of the total points for the assigned work is needed to pass the course. Points can be awarded for attendance, completed homework tasks, and short tests assigned during the course. A 100-93 % B 92-85 % C 84-77 % D 76-70 % E 69-65 %Course prerequisites: <a href="https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezhneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/">https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezhneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/</a> |       |                                                          |       |      |       |
| <b>Learning outcomes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                          |       |      |       |
| <b>Class syllabus:</b><br>Texts dealing with the most important topics for FMPI majors combining grammar revision with vocabulary needed to pass the A4 English exam.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                                          |       |      |       |
| <b>Recommended literature:</b><br>Study materials are created by the teacher and available in electronic form. Raymond Murphy: Essential Grammar in Use, Cambridge University Press, 1998 Michael McCarthy, Felicity O'Dell: English Vocabulary in Use, Cambridge University Press, 1994                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                                          |       |      |       |
| <b>Languages necessary to complete the course:</b><br>English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                          |       |      |       |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                          |       |      |       |
| <b>Past grade distribution</b><br>Total number of evaluated students: 26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                                          |       |      |       |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | B     | C                                                        | D     | E    | FX    |
| 57,69                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 15,38 | 0,0                                                      | 11,54 | 3,85 | 11,54 |
| <b>Lecturers:</b> Mgr. Ing. Jana Kočvarová                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                          |       |      |       |
| <b>Last change:</b> 17.06.2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                                          |       |      |       |

**Approved by:**

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                              |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                              |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                              |
| <b>Course ID:</b><br>FMFI.KMANM/1-<br>MAT-416/19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Course title:</b><br>Theory of Complex Variable Functions |
| <b>Educational activities:</b><br><b>Type of activities:</b> course<br><b>Number of hours:</b><br><b>per week:</b> 4 <b>per level/semester:</b> 52<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                 |                                                              |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                              |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                              |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                              |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                              |
| <b>Recommended prerequisites:</b><br>1-MAT-110 Mathematical analysis (1), 1-MAT-150 Mathematical analysis (2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                              |
| <b>Course requirements:</b><br>Evaluation during semester: 2 written tests 20 points each.<br>Final exam: written (40 points) and oral form (20 points).<br>Requirements for the final exam: 20 points minimum from semestral evaluation.<br>100 - 90 % A<br>89 - 80 % B<br>79 - 70 % C<br>69 - 60 % D<br>59 - 50 % E<br>less than 50 % FX<br>Scale of assessment (preliminary/final): 40/60                                                                                                                                                                                                      |                                                              |
| <b>Learning outcomes:</b><br>Students will gain basic knowledge in the field of complex analysis.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                              |
| <b>Class syllabus:</b><br>Complex numbers, complex plane. Stereographic projection. Paths, curves. Connected and linearly connected sets. The concept of convergence, limits, continuity and differentiability of functions of a complex variable. Conformal mappings. Curve integral of a function of complex variable. Closed paths integration theorems. Taylor and Laurent series. Properties of holomorphic functions. Isolated singular points of holomorphic functions. Residues and calculation of improper integrals. The argument principle and Rouché's theorem. Open mapping theorem. |                                                              |
| <b>Recommended literature:</b><br>Б.В. Шабат: ВВЕДЕНИЕ В КОМПЛЕКСНЫЙ АНАЛИЗ (in russian) - Shabat: Introduction to complex analysis (in english)                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                              |
| <b>Languages necessary to complete the course:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                              |

|                                                                                                                                                                           |     |       |       |      |       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-------|-------|------|-------|
| slovak, english or russian                                                                                                                                                |     |       |       |      |       |
| <b>Notes:</b><br>It is recommended to follow courses 1-MAT-210 Mathematical analysis (3), 1-MAT-250 Mathematical analysis (4) a 1-MAT-801 Topology along with this course |     |       |       |      |       |
| <b>Past grade distribution</b><br>Total number of evaluated students: 86                                                                                                  |     |       |       |      |       |
| A                                                                                                                                                                         | B   | C     | D     | E    | FX    |
| 16,28                                                                                                                                                                     | 9,3 | 11,63 | 13,95 | 18,6 | 30,23 |
| <b>Lecturers:</b> Mgr. Július Pačuta, PhD., doc. RNDr. Eugen Vízus, CSc.                                                                                                  |     |       |       |      |       |
| <b>Last change:</b> 16.06.2022                                                                                                                                            |     |       |       |      |       |
| <b>Approved by:</b>                                                                                                                                                       |     |       |       |      |       |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                   |                                                        |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                 |                                                        |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                   |                                                        |
| <b>Course ID:</b><br>FMFI.KMANM/1-<br>MAT-785/15                                                                                                                                                                                                                                                                                                                                                                  | <b>Course title:</b><br>Theory of Measure and Integral |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture / practicals<br><b>Number of hours:</b><br><b>per week:</b> 2 / 2 <b>per level/semester:</b> 26 / 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                          |                                                        |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                       |                                                        |
| <b>Recommended semester:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                   |                                                        |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                      |                                                        |
| <b>Prerequisites:</b> FMFI.KMANM/1-MAT-150/00 - Mathematical Analysis (2)                                                                                                                                                                                                                                                                                                                                         |                                                        |
| <b>Recommended prerequisites:</b><br>1-MAT-250 Mathematical analysis (4)                                                                                                                                                                                                                                                                                                                                          |                                                        |
| <b>Antirequisites:</b> FMFI.KMANM/1-MAT-785/00                                                                                                                                                                                                                                                                                                                                                                    |                                                        |
| <b>Course requirements:</b><br>Preliminary evaluation: 1 written partial exam (50%), home work (50%)<br>Final exam: written (55%)/oral (45%)<br>Indicative evaluation scale: A 90%, B 80%, C 70%, D 65%, E 55%<br>Scale of assessment (preliminary/final): 40/60                                                                                                                                                  |                                                        |
| <b>Learning outcomes:</b><br>After completing the course, students will gain basic knowledge and skills for using of Lebesgue measure and integral in problems of functional analysis, probability theory and statistics and boundary-value problems of partial differential equations.                                                                                                                           |                                                        |
| <b>Class syllabus:</b><br>Lebesgue measure, measurable functions, Lebesgue integral, convergence theorems, Fubini theorem. differentiability of monotone functions, functions of bounded variation, indefinite integral and its differentiation, absolutely continuous functions, Radon-Nikodym theorem.                                                                                                          |                                                        |
| <b>Recommended literature:</b><br>Základy teorie funkcí a funkcionální analýzy / A. N. Kolmogorov, S. V. Fomin ; přeložili z ruštiny Vladimír Doležal, Zdeněk Tichý. Praha : Státní nakladatelství technické literatury, 1975<br>Miera a integrál / Tibor Neubrunn, Beloslav Riečan. Bratislava : Veda, 1981,<br>Sergei Ovchinnikov: Measure, Integral, Derivative, A course of Lebesgue's theory, Springer 2013. |                                                        |
| <b>Languages necessary to complete the course:</b><br>Slovak in combination with English (some of the suggested readings can be in English).                                                                                                                                                                                                                                                                      |                                                        |
| <b>Notes:</b>                                                                                                                                                                                                                                                                                                                                                                                                     |                                                        |

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|------------------------------------------------|-------|-------|------|-------|-------|
| <b>Past grade distribution</b>                 |       |       |      |       |       |
| Total number of evaluated students: 22         |       |       |      |       |       |
| A                                              | B     | C     | D    | E     | FX    |
| 31,82                                          | 13,64 | 13,64 | 9,09 | 18,18 | 13,64 |
| <b>Lecturers:</b> doc. RNDr. Eugen Vízus, CSc. |       |       |      |       |       |
| <b>Last change:</b> 16.06.2022                 |       |       |      |       |       |
| <b>Approved by:</b>                            |       |       |      |       |       |

## COURSE DESCRIPTION

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                  |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                  |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                  |
| <b>Course ID:</b><br>FMFI.KMANM/1-MAT-801/15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Course title:</b><br>Topology |
| <b>Educational activities:</b><br><b>Type of activities:</b> lecture<br><b>Number of hours:</b><br>per week: 2 per level/semester: 26<br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                  |
| <b>Number of credits:</b> 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                  |
| <b>Recommended semester:</b> 4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                  |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                  |
| <b>Prerequisites:</b> FMFI.KMANM/1-MAT-110/00 - Mathematical Analysis (1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                  |
| <b>Recommended prerequisites:</b><br>1-MAT-150 Mathematical Analysis (2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                  |
| <b>Antirequisites:</b> FMFI.KMANM/1-MAT-801/10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                  |
| <b>Course requirements:</b><br>Ongoing evaluation: 2 tests, 40 points each<br>Final evaluation: oral exam, 20 points<br>Indicative rating scale: A 90%, B 80%, C 70%, D 60%, E 50%<br>Scale of assessment (preliminary/final): 100/0                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                  |
| <b>Learning outcomes:</b><br>Absolvent will acquire basic knowledge of general topology, which will enable him to study deeper topology, algebraic topology, algebra, mathematical analysis, theory of differential equations and dynamical systems.                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                  |
| <b>Class syllabus:</b><br>Topological space, topological subspace, base of topology, criterion for base, construction of topology on a set, properties of open and closed sets, set closure, dense and nowhere dense sets, mappings of topological spaces, continuity of mappings, factor topological spaces, product topology, connected and disconnected topological spaces (sets), continuous image of connected sets, separation axioms, Hausdorff and normal topological spaces, Tietze-Uryson theorem on extension of continuous functions, compact topological spaces (sets), continuous image of compact sets, criteria of compactness of topological spaces, compactification of topological spaces. |                                  |
| <b>Recommended literature:</b><br>Basics of general topology /czech/ Jří Adámek, Václav Koubek, Jan Reiterman. Praha : Státní nakladatelství technické literatury, 1977<br>What is a topology? /slovak/ Milan Hejný, Ivan Kulich, Jozef Tvarožek. Bratislava : Alfa, 1983<br>Mathematical analysis of real variable functions /slovak/ Marko Švec, Tibor Šalát, Tibor Neubrunn. Bratislava : Alfa, 1987                                                                                                                                                                                                                                                                                                       |                                  |

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| Metric spaces /slovak/ Tibor Šalát. Bratislava : Alfa,, 1981.        |      |     |       |     |      |
| Functional analysis /slovak/ Ladislav Mišík. Bratislava : Alfa, 1989 |      |     |       |     |      |
| <b>Languages necessary to complete the course:</b>                   |      |     |       |     |      |
| <b>Notes:</b>                                                        |      |     |       |     |      |
| <b>Past grade distribution</b>                                       |      |     |       |     |      |
| Total number of evaluated students: 80                               |      |     |       |     |      |
| A                                                                    | B    | C   | D     | E   | FX   |
| 56,25                                                                | 10,0 | 7,5 | 11,25 | 5,0 | 10,0 |
| <b>Lecturers:</b> prof. RNDr. Milan Medved', DrSc.                   |      |     |       |     |      |
| <b>Last change:</b> 21.06.2022                                       |      |     |       |     |      |
| <b>Approved by:</b>                                                  |      |     |       |     |      |

## COURSE DESCRIPTION

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| <b>Academic year:</b> 2021/2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                      |
| <b>University:</b> Comenius University Bratislava                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                      |
| <b>Faculty:</b> Faculty of Mathematics, Physics and Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                      |
| <b>Course ID:</b><br>FMFI.KAG/1-MAT-560/00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Course title:</b><br>Web Graphics |
| <b>Educational activities:</b><br><b>Type of activities:</b> course<br><b>Number of hours:</b><br><b>per week: 4 per level/semester: 52</b><br><b>Form of the course:</b> on-site learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                      |
| <b>Number of credits:</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                      |
| <b>Recommended semester:</b> 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                      |
| <b>Educational level:</b> I.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                      |
| <b>Prerequisites:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                      |
| <b>Course requirements:</b><br>For the semester, the student can get 50% for exercises, 20% for midterm and the final written exam has a weight of 30%. The student must obtain at least half of the points for the exercises as well as for the project in order to pass the final written exam.<br>Grading: A (100-91), B (90-81), C (80-71), D (70-61), E (60-51), Fx (50-0).<br>Scale of assessment (preliminary/final): Weight of midterm / final assessment: Mid-term assessment 20% (midterm) / + 50% project 30% final exam.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                      |
| <b>Learning outcomes:</b><br>The course offers knowledge and skills in the dynamically developing field of Internet communication through multimedia objects. Graduates will get acquainted with the rules and methods of effective authoring work and the most modern technologies in accordance with the recommendations of the ACM Computing Curriculum.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                      |
| <b>Class syllabus:</b><br>1. Basic definitions. Historic survey, state-of-the art and the future of WWW. Semantic Web a Digital Libraries. Mobile communication. Security, legal and social aspects. Webby awards.<br>2. Client-server architecture. Dominant web services and technologies. SGML, HTML, VRML, UML. Java, php, ASP.NET and others. Examples of proper use. MIME formats and RFC standards. WWW Consortium.<br>3. Text creation, digital typography and DTP. On-line publishing authoring legal aspects.<br>4. Creation and use of pictorial data for WWW.<br>5. WWW sound processing and applications.<br>6. Internet animations and video.<br>7. WWW virtual interaction. Face demo by Ken Perlin. WWW as a procedural sketch book.<br>8. Web design styles and rules after A. Glassner.<br>9. 3D web graphics, VRML a X3D.<br>10. Virtual galleries, gardens, thematic parks and chat rooms.<br>11. Social and philosophic aspects of virtual environments. Netiquette. Third wave by A. Toffler. History of virtual reality (Gibson, Krueger, Lanier, CAVE...). Cult movie Matrix and implications of its message. |                                      |

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| 12. Interakcia, navigácia a kooperácia vo virtuálnych prostrediach. Distribuovaná VR. Hry a simulátory.<br>13. Spájanie obrazu s textom. Vizuálna kritika web stránok.<br>14. Virtuálne mestá. Akvizícia, konštrukcia, prezentácia, aplikácie.<br>15. Groupware. Skupinová komunikácia. Avatari a on-line komunity. MPEG-7 a MPEG-21.                        |       |       |       |      |     |
| <b>Recommended literature:</b><br>CGEMS (web stránka ACM SIGGRAPH, <a href="http://www.siggraph.org">www.siggraph.org</a> ).<br>W3Schools tutorials (HTML, SVG...)<br>BERNERS-LEE, T. Semantic Web, Scientific American, May 2001.<br>SIGGRAPH course notes by B. Mitchell, A. Glassner and K. Perlin.<br>Class materials available from the class web page. |       |       |       |      |     |
| <b>Languages necessary to complete the course:</b><br>English, Slovak                                                                                                                                                                                                                                                                                        |       |       |       |      |     |
| <b>Notes:</b><br>The class is eventually taught in a distant mode.                                                                                                                                                                                                                                                                                           |       |       |       |      |     |
| <b>Past grade distribution</b><br>Total number of evaluated students: 955                                                                                                                                                                                                                                                                                    |       |       |       |      |     |
| A                                                                                                                                                                                                                                                                                                                                                            | B     | C     | D     | E    | FX  |
| 23,04                                                                                                                                                                                                                                                                                                                                                        | 28,17 | 23,46 | 11,62 | 4,82 | 8,9 |
| <b>Lecturers:</b> doc. RNDr. Andrej Ferko, PhD., Mgr. Marcel Makovník                                                                                                                                                                                                                                                                                        |       |       |       |      |     |
| <b>Last change:</b> 22.06.2022                                                                                                                                                                                                                                                                                                                               |       |       |       |      |     |
| <b>Approved by:</b>                                                                                                                                                                                                                                                                                                                                          |       |       |       |      |     |