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|  **UNIVERSITY OF NIŠ** |
| **Course Unit Descriptor** | **Faculty**  | Faculty of sciences and mathematics |
| **GENERAL INFORMATION** |
| Study program  | **Mathematics** |
| Study Module (if applicable) |  |
| Course title | Elementary mathematics 1 |
| Level of study | x☐Bachelor ☐ Master’s ☐ Doctoral |
| Type of course | ☐ Obligatory x☐ Elective |
| Semester  |  x ☐ Autumn ☐Spring |
| Year of study  | 2 |
| Number of ECTS allocated | 7 |
| Name of lecturer/lecturers | Vladimir Pavlović / Aleksandra Trajković |
| Teaching mode |  x☐Lectures ☐Group tutorials ☐ Individual tutorials ☐Laboratory work ☐ Project work ☐ Seminar ☐Distance learning ☐ Blended learning ☐ Other |
| **PURPOSE AND OVERVIEW (max. 5 sentences)** |
| *Acquiring knowledge of elementary to moderate level about complex numbers, Diophantine equations, algebraic equations, inequalities, elements of combinatorics as well as training in practical implementation of teaching methodology pertaining to the said topics.* |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** |
| **Complex numbers: basic operations over complex numbers and their geometrical interpretation; De Moivre's formula; algebraic characterization of certain geometrical relations between complex numbers as points in the Euclidean plane.****Some elementary numerical inequalities: the order of the harmonic, geometric, arithmetic and quadratic means; Jensen's inequality; the Cauchy Schwarz Bunyakovsky inequality; Minkowski's and Holder's inequality.*****Diophantine equations: elementary methods of solving Diophantine equations; the Gaussian integers, Euclidean domains and some more advanced methods of solving Diophantine equations.******Polynomials and algebraic equations: Vieta's formulas; representing symmetric polynomials in several variables as polynomials in elementary symmetric polynomials; algebraic equations of the second, third and fourth degree.******Elements of combinatorics: mathematical induction; permutations, variations, combinations and binomial coefficients; the inclusion-exclusion principle; the binomial theorem; generating functions and applications.******Linear homogeneous difference equation with constant coefficients***  |
| **LANGUAGE OF INSTRUCTION** |
| x☐Serbian (complete course) ☐ English (complete course) ☐ Other \_\_\_\_\_\_\_\_\_\_\_\_\_ (complete course)☐Serbian with English mentoring ☐Serbian with other mentoring \_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **ASSESSMENT METHODS AND CRITERIA** |
| **Pre exam duties** | **Points** | **Final exam** | **points** |
| **Activity during lectures** | **5** | **Written examination** | **0** |
| **Practical teaching** | **5** | **Oral examination** | **50** |
| **Teaching colloquia** | **40** | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |