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| Study Program: Mathematics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                          |                         |               |
| Type and level of studies: Bachelor studies, II semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                      |                          |                         |               |
| Course name: Algebra 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                      |                          |                         |               |
| Lecturer: Milena M. Lekić                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      |                          |                         |               |
| Status: Compulsory                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                      |                          |                         |               |
| ECTS: 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                      |                          |                         |               |
| Attendance Prerequisites: none                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                      |                          |                         |               |
| <b>Course aims</b><br>Systematization of the basics of mathematics, determination of logical reasoning procedures and development of abilities<br>for correct and creative solving of mathematical problems.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                      |                          |                         |               |
| <b>Course outcome</b><br>The student should understand the basic theorems of differential calculus, the systematic examination of functions, concepts related to definite, indefinite and improper integrals and should also be able to apply them. The students should gain a deeper understanding of the theorems, as well as the corresponding principles of proving them and should also grasp the different techniques for solving mathematical problems.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                      |                          |                         |               |
| <b>Course content</b><br><i>Theoretical part:</i><br>Logical Expression. Tautological hypotheses and consequences. Canonical forms. Predicate logic. Interpretation, model, valid formulas. On the construction of mathematical theories: definition. axiom, theorem, proof. The notion of formal theory. Fundamentals of naive set theory. The notion of relation, algebra of relations. Equivalence and partition relations. Order relations and ordered sets. Infimum and supremum. Function: basic concepts and properties. Functions with special properties. Core functions. Family of sets. Equivalent sets, countable and uncountable sets, cardinals. Operation. The concept and examples of operational and relational structures. Fundamental laws of algebraic structures.<br><i>Practical part: Exercises, Other forms of teaching, Study research work</i><br>Determining the rules and laws of mathematical and logical reasoning through examples and tasks from various mathematical fields. Constructing models of sets of predicate formulas. Determination of set constructions. Constructing equivalence relations and quotient sets. Analysis and interpretation known order relations, as well as various types of functions and their application. |                      |                          |                         |               |
| <b>Literature</b><br>1. Б. Шешеља, А. Тепавчевић. Алгебра I, Универзитет у Новом Саду, ПМФ 2004.<br>2. Г. Калајџић, Алгебра, Математички факултет, Београд 1998.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                      |                          |                         |               |
| <b>Number of active classes</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |                          |                         | Other classes |
| Lectures: 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Practical classes: 3 | Other forms of teaching: | Students' research work |               |
| <b>Teaching methods</b><br>Lectures, auditory lessons, consulting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                      |                          |                         |               |
| <b>Assessment (maximum 100 points)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                      |                          |                         |               |
| Course assignments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | points               | Final exam               | points                  |               |
| activity during lectures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 5                    | written exam             | 30                      |               |
| practical classes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | -                    | oral exam                | 35                      |               |
| term test(s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 30                   | .....                    |                         |               |
| seminar(s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                          |                         |               |
| Total                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 35                   |                          | 65                      |               |