

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                      |                          |                         |               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|--------------------------|-------------------------|---------------|
| Study Program: Mathematics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                      |                          |                         |               |
| Type and level of studies: Bachelor studies, III semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                      |                          |                         |               |
| Course name: Algebra 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                      |                          |                         |               |
| Lecturer: Alija R. Mandak                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                      |                          |                         |               |
| Status: Compulsory                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                          |                         |               |
| ECTS: 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |                          |                         |               |
| Attendance Prerequisites: Algebra 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |                          |                         |               |
| Course aims                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |                          |                         |               |
| Familiarizing with the basic algebraic structures and laws; tackling the number structure and polynomial properties. Learning practical techniques related to numbers and polynomials, as well as the basic notions of linear algebra.                                                                                                                                                                                                                                                                                                                             |                      |                          |                         |               |
| Course outcome                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                      |                          |                         |               |
| Minimal: Knowing about and understanding basic algebraic structures, primarily related to numbers. Gaining knowledge about the construction and basic structural properties of numbers. Solving problems by induction, solving systems of congruence and Diophantine equations, finding zero polynomials. Solving systems of linear equations, working with determinants and matrices.                                                                                                                                                                             |                      |                          |                         |               |
| Desirable: Observing general properties of algebraic structures such as polynomials, matrices. Solving complex problems related to numbers and polynomials.                                                                                                                                                                                                                                                                                                                                                                                                        |                      |                          |                         |               |
| Course content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                      |                          |                         |               |
| Theoretical part                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                      |                          |                         |               |
| Groupoids, semigroups, groups and their basic properties. Normal subgroups, congruences and homomorphisms. Groupoids, semigroups, groups and their basic properties. Normal subgroups, congruences and homomorphism. Theorems on homomorphisms of groups. Rings, integral domains, fields. Ring homomorphism ideals. Ring homomorphism theorems. Extended fields. Degree of extension and algebraic extensions. Euclidean algorithm. Polynomials over a ring and a field. Zero polynomial. Basic theorem of algebra and its consequences. Irreducible polynomials. |                      |                          |                         |               |
| Practical Part: Exercises, Other forms of teaching, Study research work                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |                          |                         |               |
| Working on concrete examples and solving problems in algebraic structures; determining substructures, congruence. Using elements of number theory in solving various problems. Solving congruence and Diophantine equations. Procedures for determining zero polynomials and solving typical problems using numbers and polynomials. Solving and discussing systems of linear equations. Basic tasks from determinants and matrices.                                                                                                                               |                      |                          |                         |               |
| Literature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                      |                          |                         |               |
| 1. Б. Шешеља, А. Тепавчевић , <i>Алгебра 1</i> , Универзитет у Новом Саду, ПМФ, 2004                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                      |                          |                         |               |
| 2. Љ. Кочинац, А. Мандак, <i>Алгебра 2</i> , ПМФ Приштина, 1997                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                      |                          |                         |               |
| 3. Г. Калајџић, <i>Алгебра</i> , Математички факултет, Београд, 1998                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                      |                          |                         |               |
| Number of active classes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                      |                          |                         | Other classes |
| Lectures: 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Practical classes: 3 | Other forms of teaching: | Students’ research work |               |
| Teaching methods                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                      |                          |                         |               |
| The material is presented with the help of a projector, in combination with the classical methods and interaction with present students.                                                                                                                                                                                                                                                                                                                                                                                                                           |                      |                          |                         |               |
| Assessment (maximum 100 points)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                      |                          |                         |               |
| Course assignments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | points               | Final exam               |                         | points        |
| activity during lectures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 10                   | written exam             |                         | 20            |
| practical classes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      | oral exam                |                         | 30            |
| term test(s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 40                   |                          |                         |               |
| seminar(s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                      | .....                    |                         |               |
| Total                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 50                   |                          |                         | 50            |