

Study programmes: Bachelor studies – Mathematics			
Course name: Algebra 2			
Lecturers: Milan Božić, Aleksandar Lipkovski, Dragana Todorić, Zoran Petrović, Goran Danković			
Status: Compulsory			
ECTS: 5			
Attendance prerequisites: Algebra 1			
Course aims: Acquisition of more advanced general and specific knowledge in Algebra			
Course outcome: Upon completion of the course, the students have more advanced knowledge in algebra and elementary number theory. The students understand the fundamental concepts from ring theory, field theory and number theory. The students know fundamental theorems in these areas and the main constructions. They are able to solve problems in these fields, and to attend advanced courses from algebra and other areas of mathematics in which algebra is applied.			
Course content:			
<p>Groups. Quotient groups and isomorphism theorems. Direct products. Nilpotent and solvable groups. Group actions on sets; class equality; $n!$-theorem. p-groups and Sylow theorems. Semidirect products. Generators and relations. Groups of small order.</p> <p>Rings. Axioms and immediate corollaries, ring characteristic. Zero divisors and integral domains. Ideals and congruences, quotient rings, ring Z_n. Prime and maximal ideals. Intersection, sums and products of ideals. Isomorphism theorems and direct products of rings (Chinese remainder theorem). Principal ideals, atoms, prime elements in rings. Euclidean and principal ideal domains ($Z, F[x]$) and unique factorization domains.</p> <p>Fields. Field extensions and their degree. Gauss lemma and irreducible polynomials over Q. Algebraic and transcendent elements over a field. Simple extensions. Ruler and compass constructions (problems of doubling the cube, angle trisection, squaring the circle). Constructions of regular polygons. Splitting field of a polynomial. Algebraically closed fields. Solving equations of degree 3 and 4. Historical overview of development of algebra.</p>			
Literature:			
<ol style="list-style-type: none"> 1. G. Kalajdžić, <i>Algebra</i>, Faculty of Mathematics, Belgrade 1998. 2. Ž. Mijajlović, <i>Algebra</i>, Milgor, Belgrade, 1998. 3. N. Božović, Ž. Mijajlović, <i>Uvod u teoriju grupa</i>, Naučna knjiga, Beograd 4. A. Clark, <i>Elements of Abstract algebra</i>, Dover Publ. Co. New York, 1984; 5. A. Baker, <i>A concise introduction to the theory of numbers</i>, Cambridge Univ. Press, 1984. 			
Number of hours: 4	Lecures: 2	Tutorials: 2	Laboratory: -
Research: -			
Teaching and learning methods: Lectures/ Tutorials			
Assessment (maximal 100 points)			
Course assignments	points	Final exam	points
Lectures	-	Written exam	30
Exercises / Tutorials	-	Oral exam	40
Colloquia	30	Written-oral exam	-
Essay / Project	-		