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| Study programmes: Bachelor studies – Mathematics | | | | |
| Course name: Number theory 1 | | | | |
| Lecturers: Aleksandar Lipkovski, Dragana Todorčić, Zoran Petrović, Goran Đanković | | | | |
| Status: Optional | | | | |
| ECTS: 5 | | | | |
| Attendance prerequisites: Algebra 1, Analysis 1 | | | | |
| Course aims: Acquisition of general and specific knowledge in algebraic number theory. | | | | |
| Course outcome: Upon completion of the course, the students have basic knowledge in algebraic number theory. The students understand the following concepts: primitive root, algebraic integer, field extensions, cyclotomic fields, number fields. The students know fundamental theorems of algebraic number theory. They are able to solve problems in the field, and to attend more advanced courses in number theory and algebra. | | | | |
| Course content: | | | | |
| Elementary Set Theory. The ring of integers, divisibility, congruences, prime numbers. Arithmetic functions, Mobius function, Riemann zeta function. Basic theorems of elementary number theory. Legendre and Jacobi symbol. Primitive roots, algebraic integers, characters of Abelian groups, Gauss' reciprocity theorem. Field extensions, norm, trace, discriminant. Gauss and Jacobi sums. Finite fields and Euler's criterium. Diophantine equations. Pell's equation. Last Fermat theorem. Applications in cryptography. Divisibility. Prime numbers. Congruences. Diophantine equations. Diophantine approximations. | | | | |
| Literature: | | | | |
| 1. A. Baker, <i>A concise introduction to the theory of numbers</i> , Cambridge Univ. Press, 1984; | | | | |
| 2. K. Ireland, M. Rosen, <i>A classical introduction to number theory</i> , Springer, New York 1993; | | | | |
| 3. T. Ono, <i>An Introduction to Algebraic Number Theory</i> , Plenum Press, New York and London, 1990; | | | | |
| 4. G. Kalajdžić, <i>Algebra</i> , Matematički fakultet, Beograd, 1998; | | | | |
| 5. P. Ribenboim, <i>Algebraic Numbers</i> , John Wiley & Sons, Inc. 1972. | | | | |
| 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 | - | | | |