

Study programme(s): Mathematics (MA)			
Level: master			
Course title: Number Theory (MA-10)			
Lecturers: Igor V. Dolinka, Nebojša M. Mudriski			
Status: elective			
ECTS: 5			
Requirements:			
Learning objectives The goal of the course is to introduce the basic concepts of number theory and to emphasise their importance within the system of mathematical disciplines.			
Learning outcomes <i>Minimal:</i> Understanding the basic principles of number theory and the ability to solve simpler arithmetical problems. <i>Desirable:</i> The ability to creatively solve problems from elementary number theory and comprehensive understanding of the underlying theory.			
Syllabus <i>Theoretical instruction:</i> Introductory notions, Fermat's little theorem, Euler's theorem and Wilson's theorem. Multiplicative order, primitive roots. Quadratic residues. The law of quadratic reciprocity. Classical problems about primes. Diophantine equations. Pythagorean triples, the history of Fermat's last theorem. Pell's equation. Representations of numbers by sums of squares. Gaussian integers. Deep conjectures in number theory: the Riemann Hypothesis, Schinzel's Hypothesis H, the <i>abc</i> -conjecture. Overview of contemporary trends in number theory. <i>Practical instruction:</i> Basic properties of prime numbers and the divisibility relation. Applications of the Chinese remainder theorem. Applications of Fermat's little theorem, Euler's theorem and Wilson's theorem. Working with congruences of higher degree. Solving and applications of Pell's equation. Representations of numbers by sums of squares. Applications of Gaussian integers. Conditional problem-solving under open assumptions.			
Literature 1. В. Мићић, З. Каделбург, Д. Ђукић, <i>Увод у теорију бројева</i> , Друштво математичара Србије, Београд, 2004. 2. Р. Тошић, В. Вукославчевић, <i>Елементи теорије бројева</i> , Алеф, Нови Сад, 1995. 3. И. Долинка, <i>Елементарна теорија бројева – моји омиљени задаци</i> , Друштво математичара Србије, Београд, 2007.			
Weekly teaching load			Other: 0
Lectures: 2	Exercises: 2	Other forms of teaching: 0	Student research: 0
Teaching methodology Classical methodology is used in theoretical instructions. Practical instructions are based on practising the presented principles and analyzing typical problems and their solutions. Students' knowledge is tested in two colloquia, which check both the theoretical concepts and skills of their application through problem solving. At the final oral exam, in-depth understanding of the presented material is tested.			
Grading (maximum number of points 100)			
Pre-exam obligations	points	Final exam	points
Colloquia	50	Oral exam	50