

Program		Type of studies (cycle)	Third cycle			
		Name of the program	Science and mathematics education			
Course						
Course title		Analytic number theory I				
Course code	Semester	Course status		ECTS credits	Contact hours	
PMAT 653	II	Optional		10	30	
Teaching staff	Teacher	Prof. Dr. Almasa Odžak				
	Other staff					
Course goals	<p>The main objects studied in the course are the Riemann zeta and the Dirichlet L function. Different ways of constructing these functions and their properties are discussed. Special attention is devoted to their relation to some distribution results. The relation between the Reimann zeta function and the distribution of prime numbers, i.e., the prime number theorem is discussed, as well as the relation between the Dirichlet L function and the distribution of primes in arithmetic progressions.</p> <p>The content may serve as a basis for constructing and analyzing zeta and L functions in different general contexts.</p>					
Course content/topics						
<ul style="list-style-type: none"> - Dirichlet series and Riemann zeta function, Möbius function, von Mangoldt function, and Möbius inversion formula. - Some important Dirichlet series and arithmetic functions related to the Riemann zeta function. - Meromorphic continuation and functional equation for the Riemann zeta function. - Entire function, the order of an entire and meromorphic function, Hadamard factorization theorem. - Zeros of the Riemann zeta function, factorization formulas, Hamburgers inversion theorem. - Hadamard and de la Vallée Poussin theorems. - The Prime number theorem. - Zero-free region for the Riemann zeta function. - The Riemann hypothesis and some consequences. - Finite Abelian groups and associated characters. - Gaussian sums associated to Dirichlet characters. - Dirichlet L function, its meromorphic continuation, and functional equation. - Dirichlet theorem about prime numbers in arithmetic progressions. - Distribution of prime numbers in arithmetic progressions. 						
LITERATURE			Grading			
<p>[1] G. J. O. Jameson: The prime number theorem, LMS Student texts 53, Oxford University Press, 2003.</p> <p>[2] E. C. Titchmarsh: The theory of the Riemann zeta-function, 2nd ed., revised by D. R. HeathBrown, Oxford University Press, 1986.</p> <p>[3] T. M. Apostol: Introduction to analytic number theory, UTM Springer, 1998.</p> <p>[4] M. R. Murty: Problems in analytic number theory, GTM Springer, 2001. Cambridge University Press, 1998.</p>			Criterion	Points	Cut-off points	
			1.	Written assignment		
			2.	Project		
			3	Final exam		
			Total		100	55