Program	Level	First cycle		
	Name of the program	All study programs		
COURSE				
Course title	**Elementary Number Theory**			
Course code	Semester	Course status	ECTS	Contact hours (L+AE+LE)
PMAT180	II	Mandatory course	4	2+2+0
Lecturer				
Course Goals	The main aim of the course is to understand basic terms introduced in elementary number theory, and their relationships, and to prove their properties. During the course, students will be able to learn different proving methods (such as direct and indirect proof, method of mathematical induction, contraposition, etc.).			
Learning Outcomes	After completing this course, students should demonstrate competency in the following skills: - Understand basic elementary number theory terms and apply classical elementary number theory methods; - Understand and be able to apply the Euclidean algorithm and its converse; - Solve linear Diophantine equations and simple systems of Diophantine equations, as well as polynomial congruences and simple systems of congruences; - Understand and apply divisibility tests; - Be able to calculate the order of the given number for the given modulus and primitive roots modulo m; - Determine whether a given number is quadratic residue or non-residue; - Be able to apply achieved knowledge to solve complex tasks from elementary number theory.			

COURSE CONTENT

- Divisibility, division algorithm, prime numbers.
- Greatest common divisor, least common multiple, Euclidean algorithm.
- Fundamental theorem of arithmetics.
- Linear Diophantine equations.
- Congruence and their properties.
- Linear congruences, systems of linear congruences, Chinese remainder theorem.
- Divisibility tests.
- Willson theorem, Little Fermat theorem, pseudoprime numbers.
- Euler function and its properties.
- Euler theorem, the order of the given number for given modulus and its properties.
- Primitive roots and their properties.
- Quadratic residues and their properties, Legendre symbol, quadratic reciprocity law.

LITERATURE

[1] K. H. Rosen, Elementary number theory and its applications, 5th ed., Pearson Addison Wesley, 2005.
[2] J. J. Tattersall, Elementary number theory in nine chapters, Cambridge University Press, 2001.
[3] H. Jamak, Elementarna teorija brojeva, Grafičarpromet, Sarajevo, 2013.
[4] J-M. De Koninck, A. Mercier,1001 problems in classical number theory, AMS, Providence, RI, 2007.

STUDENT WORKLOAD (hours in a semester)

Lectures	30	Exercises	30	Individual work	40	T o t a l	100

GRADING			**REMARKS**
Criterion	Maximum points	Minimum points	
Midterm exams			

Final exam			
T o t a l	100	55	