■ CE52 - Number Theory

GENERAL

SCHOOL	SCIENCES		
DEPARTMENT	MATHEMATICS		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	CE52	**SEMESTER**	E
COURSE TITLE	NUMBER THEORY		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**ECTS**
Lectures	4	5

COURSE TYPE	Scientific Field
PREREQUISITE COURSES	-
LANGUAGE OF TEACHING AND EXAMINATIONS	Greek/English
THE COURSE IS OFFERED TO ERASMUS STUDENTS	YES
COURSE WEBSITE (URL)	http://eclass.uowm.gr/

LEARNING OUTCOMES

Learning Outcomes
With this course, the students will learn the classical Number Theory, the Diofantic equations, the numerical functions, numbers modulo n, Congruencies and linear systems of congruencies.

In particular, they will learn to use issues of divisibility and factorization in the set of integers numbers and issues of finding integer solutions of types of Diofantic equations.

They will know the basic Arithmetical functions and they will learn in deep the theory of prime numbers. The notion of congruencies will be analyzed and they will know to solve linear systems of congruencies.

With the successful attendance of the course, the students will have the basic mathematical background in Number Theory. The last will give them the tools to study topics of Algebra, Geometry and Analysis.

General Competencies

- Search for, analysis and synthesis of data and information, with the use of the necessary technology.
- Working independently for the enhancement of their self-esteem.
- Creation of new research ideas.
- Production of free, creative and inductive thinking, which is based on mathematical processes.

CONTENT OF THE COURSE

- The notion of divisibility in the set of integers numbers, highest common factor and least common multiple, Euclidean division. Perfect numbers, Prime numbers, Fundamental Theorem of Arithmetic.
- Diofantic equations, Arithmetical functions, numbers modulo, Theorems of Fermat, Euler and Wilson.
- Polynomial and linear congruences, linear systems of congruences, Chinese remainder theorem.
- Primitive mod p roots. Theory of indices and quadratic residues, *Quadratic* Reciprocity *Law*, symbols of Legendre and Jacobi.

TEACHING AND LEARNING METHODS - EVALUATION

TEACHING METHOD	In the classroom.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	Use of e-class. Communication through face-to-face discussions and e-mails.
TEACHING ORGANIZATION	

Activity	**Semester Workload**
Lectures	52 hours

	Individual Study: 73 hours Course Total (25 hours per ECTS): 125 hours
STUDENT EVALUATION	Optional projects during the whole semester, with presentations. (bonus to the final grading) Written final examination 100%.

RECOMMENDED BIBLIOGRAPHY

1. Deriziotis D., An introduction to Number Theory, Publications Sophia, second version, 2012 (Grrek).
2. Tsagaris P. G., Number Theory, Publications Symmetria, third version, 2010 (Greek).
3. Poulakis D. M., Number Theory, Publications Ziti, 1997 (Greek).
4. Tzanakis N.K., Fundamental Number Theory, Department of Mathematics, University of Crete, 2019 (Greek).