■ CE86 - Algebraic Geometry

GENERAL

SCHOOL	SCIENCES		
DEPARTMENT	MATHEMATICS		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	CE86	**SEMESTER**	H
COURSE TITLE	ALGEBRAIC GEOMETRY		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**ECTS**
Lectures	4	6

COURSE TYPE	Scientific Field
PREREQUISITE COURSES	Algebra I
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
After successful completion of the course the student: • will have understood the problems with which Algebraic Geometry deals and its main goals, • will have studied and understood fundamental theorems of Algebraic Geometry, such as Nullstellensatz Theorems (Weak and Hilbert's Theorem), Bezout Theorem, Riemann-Roch Theorem.

- will understand the notions of an affine variety, projective and tangent space.

General Competencies

- Search, analysis and synthesis of data and information, using the necessary technologies.
- Individual work.
- Generation of new research ideas.
- Promotion of free, creative and inductive thinking.

CONTENT OF THE COURSE

Affine varieties, the Zariski topology, ideals of affine varieties. Radical ideals, Weak Nullstellensatz Theorem, Hilbert's Nullstellensatz, zero-dimensional ideals.

The projective space, relations between affine and projective spaces, projective algebraic sets, ideals of projective algebraic sets.

Affine, algebraic and projective varieties, dimension of affine varieties.

Tangent space and smooth points. Bezout's Theorem and its applications. Curves, degree and genus of projective curves. The Riemann-Roch Theorem and its applications.

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	98 hours
Course Total (25 hours per ECTS)	150 hours

STUDENT EVALUATION	Optional projects during the whole semester, with presentations. (bonus to the final grading) Written final examination 100%.

RECOMMENDED BIBLIOGRAPHY

1. D. Dummit, R. Foote, Abstract Algebra, 3rd edition, Wiley publications, 2004. (English)
2. Poulakis D., Algebraic Geometry, Ziti Publications, 2018. (Greek)
3. Perrin D., Algebraic Geometry, An introduction, Springer, 2008. (English)
4. Shafarevich, Igor R., Basic algebraic geometry 1, Varieties in Projective Space, Springer, 2013. (English)