COURSE OUTLINE

1. GENERAL

SCHOOL	NATURAL SCIENCES		
DEPARTMENT	MATHEMATICS		
LEVEL OF COURSE	UNDERGRADUATE		
COURSE CODE	MAT_PM435	**SEMESTER OF STUDIES**	7th
COURSE TITLE	GEOMETRY		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
Lectures and Tutorials	4	6
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Elective course
PREREQUISITE COURSES:	Recommended prerequisite knowledge: ANALYTIC GEOMETRY, EUCLIDEAN GEOMETRY AND ITS TEACHING, DIFFERENTIAL GEOMETRY I, GENERAL TOPOLOGY.
TEACHING AND ASSESSMENT LANGUAGE:	Greek
THE COURSE IS OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBPAGE (URL)	https://eclass.math.upatras.gr/courses/MATHDEP213/

2. LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning*

and Appendix B

- *Guidelines for writing Learning Outcomes*

After completing this course the student will know:

- How is a new geometry introduced and what are the main goals of studying a geometry.
- How to define Euclidean transformations in $\mathbb{R}^n$.
- Basic elements of Affine Geometry.
- Basic elements of Projective Geometry.
- Basic elements of Global Geometry.
- Basic elements of the Reverse Geometry.
- The basic models of Hyperbolic Geometry.
- How Geometries are Classified.

General Abilities

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*Others…*
Production of new research ideas	

- Adaptation to new situations.
- Working in an interdisciplinary environment.
- Autonomous Work.
- Teamwork.
- Production of new research ideas.
- Promotion of the free, creative and inductive thinking.

3. COURSE CONTENT

An axiomatic foundation of a geometry and the definition of geometry by Klein. Subgeometry of a geometry. Invariants of geometry. Isomorphic geometries. Affine Geometry of $\mathbb{R}^n$. Euclidean Geometry of $\mathbb{R}^n$. Spherical Geometry. Mobius Transformations and Reverse Geometry. Projective Geometry. Models of Hyperbolic Geometry. Geometry hierarchy. Connection of Euclidean and non-Euclidean geometries through Projective Geometry.

4. TEACHING AND LEARNING METHODS - ASSESSMENT

TEACHING METHOD *Face-to-face, Distance learning, etc.*	Lectures (face to face)
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES *Use of ICT in teaching, laboratory education, communication with students*	Support of the course via the online platform *eClass* of the Department of Mathematics.
TEACHING ORGANIZATION *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	
STUDENT ASSESSEMNT *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	**Assessment Language:** Greek **Assessment Language for Erasmus students: English** **Assessment methods:** Final written examination (100%) Minimum passing grade: 5 Μαximum passing grade: 10

Activity	***Semester workload***
Lectures	52
Solving suggested exercises	30
Hours of private study	65
Final examination	3
Total number of hours for the Course (25 hours of work-load per ECTS credit)	***150***

5. RECOMMENDED LITERATURE

(*in Greek*)

- Ζαφειρίδου Σοφία. *Γεωμετρίες*. Σημειώσεις μαθήματος, 2017.

(*in English*)

- Jeremy Gray. *Worlds Out of Nothing*. (e-book). Springer, 2007.
- Ramírez Galarza Ana Irene and Seade José. *Introduction to Classical Geometries*. (e-book). Springer, 2007.