COURSE OUTLINE

1. GENERAL

SCHOOL	NATURAL SCIENCES		
DEPARTMENT	MATHEMATICS		
LEVEL OF COURSE	UNDERGRADUATE		
COURSE CODE	MAT_PM207	**SEMESTER OF STUDIES**	4th
COURSE TITLE	ALGEBRA I		

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	5	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*	Background
PREREQUISITE COURSES:	Recommended prerequisite knowledge: INTRODUCTION TO ALGEBRA AND SET THEORY
TEACHING AND ASSESSMENT LANGUAGE:	Greek
THE COURSE IS OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBPAGE (URL)	

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*

The student is expected to be able to handle the concepts of cyclic groups, groups of permutations and matrix groups, to be able to compute the order of their elements. (S)he Is also expected to be able to handle the general ring concept (and in particular polynomial rings) and to be able to do calculations with ideals. (S)he will be able to present algebraic structures via their generators and the relations that hold among them, to study their substructures and to apply the isomorphism theorems. (S)he will be able to study factorization problems in general integral domains. Finally (s)he will be able to perform simple calculations involving finite fields and extensions of fields.

After the successful completion of the course the student will have some knowledge of algebraic structures (groups, rings, fields), their basic properties and their applications to arithmetic and geometry.

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	

- Independent work.
- Promotion of creative and inductive thinking.

3. COURSE CONTENT

Introductory concepts (groups, subgroups, Lagrange's theorem, homomorphisms, normal subgroups). Cyclic groups, generators. Classification of cyclic groups. Groups of permutations. Cayley's theorem. Quotient groups, isomorphism theorems. Rings and fields, integral domains, homomorphisms – ring isomorphisms. The field of fractions of an integral domain. Polynomial rings. Factorization of a polynomial over a field, irreducible polynomials. Prime, maximal and principal ideals. Quotient rings. Principal ideal domains. Unique factorization rings. Euclidean rings. Gaussian integers and rings.

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*	
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*	

Activity	*Semester workload*
Lectures	39
Tutorials	26
Individual study	82
Final Exam	3
Total number of hours for the Course (25 hours of work-load per ECTS credit)	***150***

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:** Written Final Course Examination Minimum passing grade: 5 Maximum passing grade: 10

5. RECOMMENDED LITERATURE

(in Greek)

- Βάρσος Δημήτριος Α., Δεριζιώτης Δημήτριος Ι., Εμμανουήλ Ιωάννης Π., Μαλιάκας Μιχαήλ Π. και Ταλέλλη Ολυμπία Π. *Μια Εισαγωγή στην Άλγεβρα*. 3η Έκδοση, Εκδόσεις Σοφία, 2012.
- Fraleigh John. *Εισαγωγή στην Άλγεβρα*. Εκδόσεις ΙΤΕ – Πανεπιστημιακές Εκδόσεις Κρήτης, 2010.
- Πουλάκης Δημήτριος. *Άλγεβρα*. 2η Έκδοση, Εκδόσεις Ζήτη, 2013.