

## COURSE OUTLINE

### GENERAL

<b>SCHOOL</b>	School of Science		
<b>ACADEMIC UNIT</b>	Department of Mathematics		
<b>LEVEL OF STUDIES</b>	Postgraduate		
<b>COURSE CODE</b>	<b>AA7</b>	<b>SEMESTER</b>	<b>2nd Semester</b>
<b>COURSE TITLE</b>	Specialized Topics in Algebra		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <i>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</i>		<b>WEEKLY TEACHING HOURS</b>	<b>CREDITS</b>
		3	7,5
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
<b>COURSE TYPE</b> <i>general background, special background, specialised general knowledge, skills development</i>	Special Background		
<b>PREREQUISITE COURSES:</b>			
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	Yes		
<b>COURSE WEBSITE (URL)</b>			

### LEARNING OUTCOMES

<p><b>Learning outcomes</b>  <i>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.</i></p> <p><i>Consult Appendix A</i></p> <ul style="list-style-type: none"> <li>• <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i></li> <li>• <i>Descriptors for Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i></li> <li>• <i>Guidelines for writing Learning Outcomes</i></li> </ul>
<p>The aims of the course are:</p> <p>The postgraduate student to reach a good level of theoretical background on topics related to the theory of commutative rings.</p>

### General Competences

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?

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

The aim of the course is to empower the postgraduate student to analyse and compose basic notions of Commutative Algebra.

### SYLLABUS

Topics of Commutative and Combinatorial Algebra: Hilbert's Basis theorem, Primary Decomposition, Localization, Dimension, Hilbert Series, Groebner Bases, Simplicial complexes and homology, Stanley-Reisner ideals, Hilbert's Nullstellensatz theorem.

## TEACHING and LEARNING METHODS - EVALUATION

<p><b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i></p>	Face-to-face	
<p><b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i></p>		
<p><b>TEACHING METHODS</b> <i>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.</i></p> <p><i>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</i></p>	<b>Activity</b>	<b>Semester workload</b>
	Lectures	39 hours
	Study of theory and solving of exercises	39 hours
Course total	<b>78 hours</b>	
<p><b>STUDENT PERFORMANCE EVALUATION</b> <i>Description of the evaluation procedure</i></p> <p><i>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</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	Written exam at the end of semester (obligatory) , problem solving or/and intermediate exams (optional)	

## ATTACHED BIBLIOGRAPHY

- *Suggested bibliography:*

- *Related academic journals:*

Μαλιάκας Μιχάλης, Εισαγωγή στην Μεταθετική Άλγεβρα, Εκδόσεις Σοφία, 2008

(translation, Maliakas Michalis, Introduction to Commutative Algebra (Greek), Sofia Editions, 2008)

Atiyah, M. F.; Macdonald, I. G., Introduction to commutative algebra. Addison-Wesley Publishing Co., 1969 ix+128 pp.