COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF MATHEMATICS		
LEVEL OF STUDIES	UNDERGRADUATE PROGRAM		
COURSE CODE		**SEMESTER**	**A**
COURSE TITLE	FUNDAMENTALS OF MATHEMATICS		
INSTRUCTOR	Nikolaos Dafnis		
INDEPENDENT TEACHING ACTIVITIES		**WEEKLY TEACHING HOURS**	**CREDITS**
		6	9
COURSE TYPE	General knowledge		
PREREQUISITE COURSES:	NO		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES		
COURSE WEBSITE (URL)	http://www.math.aegean.gr/index.php/en/academics/undergraduate-programs		

(2) LEARNING OUTCOMES

Learning outcomes
Review of basic notions and techniques which the students have been taught from secondary education. The aim of the course is the familiarization of the students with calculations and problem solving techniques. On the successful completion of the course the students will be able to use basic notions and techniques which are necessary for the following courses of the curriculum of the department.
General Competences
Working independently. Team work. Working an interdisciplinary environment

(3) SYLLABUS

1. Absolute values. Algebraic identities and inequalities. Arithmetic and geometric progression. Newton's binomial theorem. Binomial coefficients. Definition of complex numbers.
2. Elementary functions of a real variable. Injective and surjective functions. Composition of functions. Inverse function. Graphs of functions. Polynomials. Second degree polynomials. Polynomial division. Integral roots of polynomials. Factorization of polynomials. Exponential and logarithmic functions. Hyperbolic functions.
3. Trigonometric functions. The trigonometric circle. Trigonometric identities. Inverse trigonometric functions. Cosine and sine laws.
4. Systems of linear equations. Gauss elimination method. Matrices of order 2 and 3. Operations between matrices. The inverse matrix. Application to the study of linear systems. Determinants of order 2 and 3. Cramer's rule. Consistent and Inconsistent 2x2 and 3x3 Systems of Equations. Calculation of the inverse matrix.

TEACHING MATERIAL DISTRIBUTION	The teaching material of the course is uniformly distributed during the semester.

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY</td><td>Face-to-face lectures</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</td><td>Communication with students via e-mail</td></tr>
<tr><td>TEACHING METHODS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>52</td></tr>
<tr><td>Tutorial</td><td>26</td></tr>
<tr><td>Independent Study</td><td>147</td></tr>
<tr><td>Course total (25 per ECTS)</td><td>225</td></tr>
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<tr><td>COURSE COMMITMENTS</td><td>Attending course and tutorial sessions is not obligatory.</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION</td><td>Student’s evaluation is done in Greek through a written examination which includes short-answers questions and problem solving. For students with disabilities, evaluation takes place via oral exams.</td></tr>
</table>

(5) ATTACHED BIBLIOGRAPHY

1. Α. Τσολομύτη, “Σύνολα και Αριθμοί”, Κωδικός Βιβλίου στον Εύδοξο: 50659157
2. Ian Stewart, David Tall, “Τα Θεμέλια των Μαθηματικών”, Κωδικός Βιβλίου στον Εύδοξο: 94689288
3. Timothy Gowers, “ΜΑΘΗΜΑΤΙΚΑ Μια συνοπτική εισαγωγή”, Κωδικός Βιβλίου στον Εύδοξο: 94643783
4. D.E.Littlewood, “Στοιχειώδης εισαγωγή στα ανώτερα μαθηματικά”, Κωδικός Βιβλίου στον Εύδοξο: 16095