

COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF MATHEMATICS		
LEVEL OF STUDIES	UNDERGRADUATE PROGRAM		
COURSE CODE	311-3900	SEMESTER	A
COURSE TITLE	FUNDAMENTALS OF MATHEMATICS		
INSTRUCTOR			
INDEPENDENT TEACHING ACTIVITIES	WEEKLY TEACHING HOURS	CREDITS	
	6	9	
COURSE TYPE	General background		
PREREQUISITE COURSES:	NO		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES		
COURSE WEBSITE (URL)	https://www.math.aegean.gr/index.php/en/education/undergraduate-programs		

(2) LEARNING OUTCOMES

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

(3) SYLLABUS

<ol style="list-style-type: none"> 1. Natural numbers, Peano axioms, the least number principle and its relation to mathematical induction. The Integers and the basic properties of Integer Divisibility. Rational Numbers. Unique factorization property, greatest common divisor, least common multiple, Bezout coefficients, properties. Euclidian algorithm, rational numbers. 2. Polynomials. Operations in polynomials, factorization, division. Trigonometric functions, the trigonometric circle. Trigonometric identities. Inverse trigonometric functions. Cosine and sine laws. Graphs of trigonometric functions, hyperbolic trigonometric functions and their relations with the trigonometric functions. 3. Complex numbers. Definition. Operations. Complex plane, geometric representation, modulus and argument. Polar form, operations in polar form. Powers of complex numbers (positive and negative), de Moivre's theorem, multiple angle formulas, nth roots of unity, nth roots of a complex number. Euler's formula, Euler's identity. 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

DELIVERY	Face-to-face lectures.	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	<ul style="list-style-type: none">• Communication with students via e-mail.• Uploading course material on moodle system.	
TEACHING METHODS	Activity	Semester workload
	Lectures	52
	Tutorial	26
	Independent Study	147
	Course total (25 per ECTS)	225
COURSE COMMITMENTS	Attending course and tutorial sessions is not obligatory.	
STUDENT PERFORMANCE EVALUATION	Student's evaluation is done in Greek through a written examination. For students with disabilities, evaluation takes place via oral exams..	

(5) ATTACHED BIBLIOGRAPHY

<ol style="list-style-type: none">1. A. Τσολομύτης, Σύνολα και Αριθμοί, Εκδόσεις Leader Books, 2004, ISBN:960-7901-47-9.2. I. Stewart, D. Tall, Τα Θεμέλια των Μαθηματικών.3. T. Gowers, ΜΑΘΗΜΑΤΙΚΑ Μια συνοπτική εισαγωγή.4. D.E. Littlewood, Στοιχειώδης εισαγωγή στα ανώτερα μαθηματικά.
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