COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Technology		
ACADEMIC UNIT	Department of Environmental Sciences		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**AY101**	**SEMESTER**	**1st**
COURSE TITLE	**MATHEMATICS I**		
INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**		**CREDITS**
Teaching Hours	6		5
COURSE TYPE	General background		
PREREQUISITE COURSES	None		
LANGUAGE OF INSTRUCTION and EXAMINATIONS	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No		
COURSE WEBSITE (URL)	https://eclass.uth.gr/courses/ENV_U_101/		

(2) LEARNING OUTCOMES

Learning outcomes

Upon successful completion of the course, students will have acquired the first basic knowledge of mathematics required to attend a Level 6 study programme in general, and more specifically to attend a series of other courses in the Environmental Sciences study programme. Specifically, they will have gained knowledge on:

- Analytical Geometry, concerning vectors, lines, levels, conical sections and coordinate systems in space.
- Linear Algebra, that will allow them to work with tables, solve linear equation systems, and find eigenvalues and eigenvectors.
- Mathematical Analysis of real functions of a variable, that can be applied with limits, continuously, derivatives and integrals of a function, and sequences and series.

General Competences

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Decision-making
- Working independently
- Team work
- Criticism and self-criticism
- Production of free, creative and inductive thinking

(3) SYLLABUS

Analytical Geometry:

- Vectors, dot product and cross product of vectors, direction cosine, vector projection to vector.
- Linear equation, point distance from a line, equation of a plane, distance of a point from a plane. Conic sections, ellipse, hyperbola, circle, parabola.
- Coordinate systems and transformations.

Linear Algebra:

- Matrices, algebra of matrices, inverses and symmetric matrices. Determinants.
- Linear systems, Cramer method and Gauss method.
- Vector spaces, linear independence, basis. Linear plots, base change.
- Eigenvalues and eigenvectors.

Analysis of Functions of One Variable:

- Introduction to real functions of one real variable. Function Categories: Exponential, Logarithmic, Trigonometric, Hyperbolic, Inverse trigonometric.
- Function limits and continuity. Derivatives and function study. The meaning of differential.

- Integrals - Antiderivation. Basic methods of integration.
- Definite Integrals. Integration Techniques – Applications
- Improper Integrals. Excising Criteria. Integration Methods.
- Sequences. Numerical Series. Dynamical Series. Taylor – Maclaurin Series.

(4) TEACHING and LEARNING METHODS – EVALUATION

DELIVERY	Face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	• Use of PowerPoint slides • View material in video • Communication with students via e-mail • Use of asynchronous distance learning (e-class)
TEACHING METHODS	

Activity	***Semester workload***
Lectures	52
Laboratory practice	26
Study and analysis of bibliography	35
Essay writing	12
Course total (25 hours workload per credit)	125

STUDENT PERFORMANCE EVALUATION	Students' performance is evaluated in the Greek language. The final grade is determined by: • A written exam (at the end of the semester) that contributes 90% to the final grade, applying one or more of the following evaluation methods: Multiple choice questions, short-answer questions, problem solving. • Students' participation in laboratory practice activities and the preparation and delivery of related written assignments (during the semester) that contribute 10% to the final grade. **Final Grade =90% Exam Grade + 10% Assignments Grade**

(5) ATTACHED BIBLIOGRAPHY

- Georgiou, D., Iliadis, S., & Megaritis, A. (2018) *Real Analysis,* (3rd ed). Thessaloniki: TZIOLA Publications (in Greek)
- Mylonas, N., Schoinas, C., & Papaschoinopoulos, G. (2016) *Calculation of Functions of a Variable and Linear Algebra,* (2nd ed). Thessaloniki: TZIOLA Publications (in Greek)
- Rassias, Th. (2017) *Mathematics I,* (2nd ed). Athens: TSOTRAS Publications (in Greek)