COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Engineering		
ACADEMIC UNIT	Department of Naval Architecture		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	NAOME1101	**SEMESTER**	1st
COURSE TITLE	**MATHEMATICAL ANALYSIS I**		
INDEPENDENT TEACHING ACTIVITIES		**WEEKLY TEACHING HOURS**	**CREDITS (ECTS)**
Lectures		4	5
COURSE TYPE *general background, specialbackground, specialised general knowledge, skills development*	General background		
PREREQUISITE COURSES:			
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBSITE (URL)	https://eclass.uniwa.gr/courses/NA185/		

(2) COURSE GOALS / LEARNING OUTCOMES

The purpose of this course is to provide students with the background mathematics required for subsequent engineering courses. Specifically, it aims to provide students with the core mathematical skills and knowledge needed to perform fundamental mathematical procedures for solving engineering problems.

Learning Outcomes:

On completion of this course the student should be able to:

- use matrix algebra to solve a system of linear equations
- recognize the properties of common real functions of a single variable functions (polynomials, exponentials, logarithms, trigonometric and inverse trigonometric functions)
- formulate and solve problems using techniques of differential and integral calculus
- recognize the properties of complex numbers and apply them to solve algebraic equations.

(3) COURSE CONTENT / SYLLABUS

1. Real functions
- Even and odd functions, monotonicity, periodicity.
- Common functions, Sums, Differences, Products, and Quotients.

2. Limits and continuity
- Limit of a function and limit laws. Precise definition.
- Continuity: Definition, properties, basic theorems.

3. Differentiation
- Rates of change, Tangents and the Derivative at a Point.
- The derivative as a function.
- Differentiation rules.
- The chain rule.
- Applications of derivatives: Extreme values of functions, Mean value theorem, Monotonic Functions and the first derivative test, Concavity, Applied optimization.
- Linearization and differential, Taylor's polynomial.

4. Integration
- Area and estimation with finite sums.
- Definition and properties of Riemann integral, Applications.

5. The relationship between differentiation and integration
- Indefinite integral.
- The fundamental theorem of Calculus.
- Techniques of integration.
- Improper integrals.

6. Sequences and series
- Sequences.
- Infinite series: Definition, properties, convergence tests.
- Power series.
- Taylor and Maclaurin series.

7. Complex numbers
- Definition, arithmetic operations.
- Conjugate, modulus and argument of a complex number, Polar and exponential form.
- Square root, logarithm and powers of a complex number. Elementary complex functions.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY Face-to-face, Distance learning, etc.	Face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY Use of ICT in teaching, laboratory education, communication with students	• Use of ICT in teaching. • Use of mathematical software. • Support learning through the electronic e-class platform.

TEACHING METHODS

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	*Workload (hours)*
Lectures	39
Practice exercises (tutorials)	13
Study of Lectures	91
Course total	**143**

activity are given as well as the hours of non- directed study according to the principles of the ECTS	
STUDENT PERFORMANCE EVALUATION *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*	Final written examination: 100%

(5) ATTACHED BIBLIOGRAPHY

1. R.L. Finney, M.D. Weir, F.R. Giordano, Thomas' Calculus, 12th edition, Addison-Wesley, 2010.
2. R. Courant, F. John, Introduction to Calculus and Analysis I, Springer, 1999.
3. J. Stewart, Calculus, 6th Edition, Brooks/Cole, 2008.
4. W.L. Briggs, L. Cochran, B. Gillett, Calculus, 2nd edition, Pearson, 2015.
5. B.P. Palka, An Introduction to Complex Function Theory, Springer, 1991.