COURSE OUTLINE

(1) GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	Mechanical Engineering		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΓΕ0101	**SEMESTER**	1st
COURSE TITLE	Applied Mathematics I		

INDEPENDENT TEACHING ACTIVITIES *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*	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures	4	6
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialized general knowledge, skills development*	Core, General Knowledge
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://www.mie.uth.gr/?page_id=17675&lang=en

(2) LEARNING OUTCOMES

Learning outcomes

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.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

This course aims to provide to the students all those mathematical notions in order to develop and upgrade their mathematical way of thinking in understanding and problem solving. Following the successful completion of the course it is expected that the students are able to learn and to use mathematical tools such as differentiation and integration, sequences and series and basic elements of analytic and differential geometry in describing and problem solving.

Upon successful completion of this course, the student will be able to:

- Calculate the limit and the derivative of any function of one variable (and implicit differentiation)
- Calculate the indefinite and definite integral and to apply them in calculation of a plane area, length of a curve etc.
- Calculate an improper integral.
- Define the equation (parametric equations) of a line and a plane.

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?

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

- Calculate the curvature of a curve.
- Calculate the partial and the directional derivative of a function of two or three variables
- Define a vertical line and the tangent plane of a surface.
- Calculate the limit of a sequence.
- Define the convergence of an infinite series and the radius of convergence of a power series.
- Apply a power series to calculate a limit or an integral.

(3) SYLLABUS

Basic notions of functions (inverse function). Trigonometric and Hyperbolic functions and their inverse. Limit continuity and the differential of a function of one variable. Theorem L' Hopital. Techniques of integration. Definite integral and its applications (plane area, length of a curve, volume of a solid of revolution). The improper integral.
The notion of a sequence. Limit of a sequence. Infinite series. Criteria of series convergence. Power series and its radius of convergence. Taylor's theorem.
Inner and outer product of vectors. Parametric equations of a line in 3-dimensional space. Equation of plane. Polar coordinates. Vector function and Curves. Velocity and acceleration. Curvature of a curve. Partial and directional derivative.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY ***Face-to-face, Distance learning, etc.***	Class
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Usage of web pages

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 are given as well as the hours of non- directed study according to the principles of the ECTS

Activity	*Semester workload*
Lectures	60
Exercises	30
Autonomous work	60
Course total	***150***

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* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Written final exams

(5) ATTACHED BIBLIOGRAPHY

-Suggested bibliography:

1. Απειροστικός Λογισμός, (ενιαίος Τόμος) Finney-Weir-Giordano, ΙΤΕ/Παν/κες Εκδόσεις Κρήτης.
2. Μ. Αδάμ, Ι. Χατζάρα, Ν. Ασημάκη, https://repository.kallipos.gr/handle/11419/6356.
3. Μαθηματική Ανάλυση Ι, Θ. Ρασσιάς, εκδόσεις Τσότρας
4. Μαθηματική Ανάλυση ΙΙ, Θ. Ρασσιάς, εκδόσεις Τσότρας