COURSE OUTLINE

(1) GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	Department of Computer Engineering and Informatics		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	CEID_ NY101	SEMESTER	1st
COURSE TITLE	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, Tutorials	3 (L), 2 (T)	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		5

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	General background
PREREQUISITE COURSES:	None
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek (the course may be offered in English for Erasmus students).
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	https://eclass.upatras.gr/courses/CEID1133/

(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*

Upon conclusion of the course the students ought to be able:

- To know the properties of real numbers and use them in relevant problems i.e., solving equations and inequalities, finding supremum or infimum.
- To check whether a sequence is bounded or monotone or convergent and to find the limit whenever it exists.
- To be familiar with the notion of a series and know the basic criteria of convergence.
- To know to compute basic limits and be familiar with the meaning of continuity. To know how to use the Intermediate Value Theorem in showing existence of roots of equations.
- To know the geometric and physical meaning of derivatives and the theorems of Rolle, Mean value and Taylor.
  To find the extreme and inflection points of functions and draw typical graphs.
- To know the meaning of definite and indefinite integral, the properties and the basic technics of integration.
- To know the difference between a definite and an improper integral and to evaluate typical improper integrals of first and second type.
- To find the interval of convergence of a power series and to expand some basic functions in power series.
- To know the algebra and geometry of complex numbers and in particular to describe geometrically various types of equations or inequalities, and to find complex roots.

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

(3) SYLLABUS

- Sets and functions.
- Real numbers, mathematical induction, sequences, and series of real numbers.
- Real functions of a real variable, limits, continuity, derivatives, Rolle, Mean value and Taylor theorems.
- The definite and indefinite integral, techniques of integration, improper integrals.
- Taylor expansions, approximation, and error.
- Complex numbers, measure and argument, the complex plane, trigonometric and exponential form of complex numbers, De Moivre theorem.

(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*	**The course makes use of the facilities offered by the e-Class environment. All course notes and transparencies are placed online, as well as other additional material.**
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	3*13=39
Tutorials (exercise sessions)	2*13=26
Solving exercises	4*13=52
Non-guided study	2*13=26
Final Exam	3
Course total	***146***

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.*	The **language of evaluation** is Greek (English in the case of attendance by foreign students). **Method of evaluation**: The final grade is based 100% on performance on the final written examination. **Grading scale 0-10.** Passing grade greater than or equal to 5.

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

(in Greek)

- R.L. Finney, M.D. Weir, F.R. Giordano, Thomas Απειροστικός Λογισμός (σε ένα τόμο) (μετάφραση της 10ης Έκδοσης), Πανεπιστημιακές Εκδόσεις Κρήτης, 2015.
- M. Spivak, Διαφορικός & Ολοκληρωτικός Λογισμός 2η Έκδοση (μετάφραση της 4ης Έκδοσης), Πανεπιστημιακές Εκδόσεις Κρήτης, 2015.

(in English)

- R.L. Finney, M.D. Weir, F.R. Giordano, Thomas' Calculus, 10th edition, Addison-Wesley, 2003.
- M. Spivak, Calculus, 4th edition, Publish or Perish, 2008.

Related academic journals: