COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF ELECTRONICS ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	2603001	**SEMESTER**	3
COURSE TITLE	Applied Mathematics		

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 (ECTS)**
Lectures	4	6
Laboratory	0	
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, specialised general knowledge, skills development*	General Background Course
PREREQUISITE COURSES:	None
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES (in English)
COURSE WEBSITE (URL)	http://vplace.teipir.gr/hn_efmath

(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 successful completion of this course module students possess advanced knowledge, skills and competences in the subject of Mathematics that enable them to:

1. Know and be able to apply the Laplace operator and Hamilton operator to compute gradient, deviation, rotation, etc. for various types of functions;
2. Solve basic problems in Vector Analysis;
3. Perform analysis of functions of many variables, compute limits, continuity, derivative, etc.;
4. Decide whether a given function is harmonic or not;
5. Apply taught methods to compute extreme points (maxima and minima) of functions of two or more variables;
6. Calculate the line integrals of the first and of the second type;
7. Calculate double integrals with change of variables;
8. Apply the taught methods to solve simple and complex problems;

9. Select the appropriate method for the solution of a given problem; do this for problems coming from various fields of science and technology;
10. Work in groups to analyze and solve complex problems.

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…*
	…….

- Working independently
- Team work
- Production of free, creative and inductive thinking

(3) COURSE CONTENT

Lectures:

1. Introduction to the Lagrange operators.
2. Vector Analysis for functions of many variables.
3. Harmonic functions.
4. Laplace and Hamilton operators.
5. Gradient, deviation, rotation etc. for various types of fields.
6. Functions of many variables: limits, continuity, partial derivatives, Taylor expansion, etc.
7. Extreme points for functions of many variables.
8. Line integrals of the first and of the second type.
9. Double integrals.
10. Double integrals with change of variable.
11. Green's Theorem.
12. Introduction to the Z Transform; inverse Z Transform of rational functions.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face lectures
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	• Use of electronic presentation with multimedia content in class, • Student support through the course webpage and the departmental e-learning platform, • Electronic communication of instructors and students, through the course webpage and by e-mail.
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*	Lectures, assignments, study.

Activity	***Semester workload***

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*	<table><tr><th></th><th>*(hours)*</th></tr><tr><td>Lectures</td><td>52</td></tr><tr><td>Study for lectures</td><td>52</td></tr><tr><td>Homework Assignments</td><td>52</td></tr><tr><td>Study and preparation for exam</td><td>24</td></tr><tr><td>***Course Total***</td><td>***180***</td></tr></table>
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.*	Student evaluation is performed in the language of instruction. Final written exam on all taught material (70%) Homework Assignments turned in during the semester (30%)

(5) ATTACHED BIBLIOGRAPHY

Essential reading

1. Functions of Multiple variables, Georgoudis, Makrigiannis, Sassalos, (in Greek).
2. Basic Subjects in Arithmetical Analysis, Alexandropoulos, Paliatsos, Sofianos, (in Greek).
3. Functions of Multiple Variables**,** Anastasatos, (in Greek).