COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF ELECTRONICS ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	2602001	**SEMESTER**	2
COURSE TITLE	Mathematics II		

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	7
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_math2

(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. Identify, name and classify first order differential equations; solve such equations applying taught methods;
2. Identify, name and classify higher order differential equations and systems of differential equations; solve such equations applying taught methods;
3. Know and be able to explain in writing the nature, role and basic laws of Laplace Transform and of frequency domain;
4. Apply Laplace Transform to solve ordinary differential equations;
5. Differentiate between Laplace Transform and Fourier Transform; judge which of them is applicable for the solution of a given problem;
6. Understand and be able to explain (by plotting functions and waveforms) the notion of

periodicity and its expression in time and in frequency;
7. Use Fourier Series to compute power spectra of periodic signals (waveforms);
8. Apply taught methods in solving (analysis and synthesis of a solution) composite problems coming from various fields of science and technology;
9. Comparatively evaluate alternative methods for solving composite problems;
10. Work in a group to solve problems in group assignments.

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…*
	…….

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

(3) COURSE CONTENT

Lectures:

1. Introduction to differential equations.
2. Homogeneous differential equations of the first order.
3. The use of the integral Euler factor m.
4. Linear differential equations of the first order.
5. Various kinds of differential equations: Bernoulli, Ricatti, Clairaut, Euler, etc.
6. Wronski's methods.
7. Introduction to the Laplace Transform.
8. Solution of differential equations using Laplace Transform.
9. The inverse Laplace Transform and its uses.
10. Fourier Transform – Fourier Series.
11. Fourier Series computation for periodic signals (waveforms).
12. Composite problems solving – applications from various fields of science and technology.

(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	Lectures, assignments, study.

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 (hours)***
Lectures	52
Study for lectures	78
Homework Assignments	52
Study and preparation for exam	28
Course Total	***210***

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. Differential Equations, I. Geogoudis, A. Paliatsos, N. Prezerakos, (in Greek).
2. Applied Mathematics, III, A. Alexandrpoulos, (in Greek).
3. Laplace and Fourier transformations, Gagalis, (in Greek)
4. Differential Equations, D. Anastasatos, (in Greek)