COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Engineering		
ACADEMIC UNIT	Department of Naval Architecture		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	NAOME1120	**SEMESTER**	4th
COURSE TITLE	**DIFFERENTIAL EQUATIONS**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS (ECTS)**
Lectures	4	4

COURSE TYPE *general background, specialbackground, specialised general knowledge, skills development*	General background
PREREQUISITE COURSES:	Mathematical Analysis I, Mathematical Analysis II
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

(2) COURSE GOALS / LEARNING OUTCOMES

The laws of nature are expressed as differential equations and almost all science and engineering disciplines use differential equations to model various natural phenomena. Scientists and engineers must know how to solve those equations and interpret the solutions. The course focuses on linear differential equations and their applications in science and engineering.

Learning outcomes:

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

- Identify the type of a given differential equation and select and apply the appropriate analytical technique for finding the solution of first and second order ordinary differential equations.
- Solve linear systems of ordinary differential equations.
- Classify partial differential equations, apply analytical methods, and physically interpret the solutions.
- Use the method of separation of variables to solve some partial differential equations.

(3) COURSE CONTENT / SYLLABUS

Ordinary Differential Equations (ODEs): Definition, initial value problems and related theorems. First order linear differential equations, Bernoulli and Riccati equations. Second order differential equations. First order systems.

Partial Differential Equations (PDEs): Differential equations of classical Mathematical Physics (Laplace, Heat, Wave equation). First order PDEs. Classification of second order PDEs. Boundary value problems. Separation of variables. Green's functions. Integral transforms, the Fourier Transform, the Laplace transform.

(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 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%

Activity	*Workload (hours)*
Lectures	39
Practice exercises (tutorials)	13
Study of Lectures	65
Course total	**117**

ATTACHED BIBLIOGRAPHY

1. W.E. Boyce, R.C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th edition, Wiley, 2009.
2. W.A. Strauss, Partial Differential Equations: An Introduction, Wiley, 2008.
3. G.F. Simmons, Differential Equations with applications and historical notes, McGraw-Hill, Inc., New York, 1991.
4. I. Sneddon, Elements of Partial Differential Equations, McGraw-Hill, Inc., 1964.
5. E. Kreyszig, Advanced Engineering Mathematics, Wiley, 2011.