COURSE OUTLINE

1. GENERAL

SCHOOL	Of Engineering		
DEPARTMENT	of Environmental Engineering		
LEVEL OF STUDIES	First cycle, General Education		
COURSE CODE	TMC160	**SEMESTER**	**3nd**
COURSE TITLE	**Probability and Numerical Analysis**		

TEACHING ACTIVITIES	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
	6	5

COURSE TYPE	Compulsory
PREREQUISITES:	
TEACHING & EXAMINATION LANGUAGE:	Greek
COURSE OFFERED TO ERASMUS STUDENTS:	No
COURSE URL:	https://eclass.duth.gr/courses/TMC296/

2. LEARNING OUTCOMES

Learning Outcomes
The scopus of the course is to introduce the students to basic concepts concerning Probabilities, Statistics and Numerical Methods for solving algebraic equations, Linear Systems, Differential equations, e.t.c. which are necessary for all students of School of Engineering.
General Skills
Search, analysis and synthesis of data and information, Critical thinking Decision making Project design and management Production of new research ideas Promoting free, creative and inductive reasoning

3. COURSE CONTENT

Permutations and Combinations. Probability. Conditional probability. Bayes Theorem. Continuous and Discrete Random Variables. Distribution Function. Probability Density Function. Mean, Variance, Standard Deviation, Median. Distributions: Bionomical Distribution, Geometrical Distribution, Poisson Distribution, Exponential Distribution, Normal Distribution, Typical Normal Distribution. Functions of Random Variables, Central Limit Theorem. Estimation of Parameters. Method of Moments. Confidence Intervals. Testing of Hypothesis. X^2 test. Regression Analysis. Confidence Intervals in Regression Analysis. Correlation Analysis.

Solutions of Equations by Iteration: Bisection Method, Fixed-Point Iteration, Newton's Method, Secant Method. Numerical Methods in Linear Algebra: Linear Systems, Crout Method, Jacobi Iteration, Gauss-Seidel Iteration, Interpolation: Newton's Forward Difference Formula, Lagrange Interpolation, Splines. Numerical Integration: Trapezoidal Method, Simpson's Rule of Integration, Numerical Methods for Differential Equations: Euler Method, Runge-Kutta Methods, Method of Determined Coefficients.

4. LEARNING & TEACHING METHODS - EVALUATION

TEACHING METHOD	Face to face
USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT)	The lectures are uploaded on the e-class platform in the form of pdf files. Use of ICT in Teaching (power point, Excel etch.) . Communication with students through the platform e-class.
TEACHING ORGANIZATION	Lectures
STUDENT EVALUATION	Written examination at the end of the semester

5. SUGGESTED BIBLIOGRAPHY

1. Statistics Theory and Applications, F. Kolyva-Machera, E. Bora-Santa, Ziti, 1998, ISBN 960-431-338-X
2. Probability Concepts in Engineering Planning and Design, Basic Principles (Probability Concepts in Engineering Planning & Design), A. H.-S. Ang, Wilson H. Tang, Wiley and Sons, Inc 1975, ISBN 0-471-03200-X
3. Basic Chapters of Numerical Analysis, M.N. Kesoglides, Anikoula, 2005, ISBN 960-516-024-2.

ANNEX OF THE COURSE OUTLINE

Alternative ways of examining a course in emergency situations

Teacher (full name):	Garyfallos Papaschinopoulos / Gesthimani Stefanidou	
Contact details:	gstefani@env.duth.gr	
Supervisors: (1)		
Evaluation methods: (2)	Written (60%) and oral (40%) examinations at the end of the semester	
Implementation Instructions: (3)	➢ The student ought • to enroll in platform eclass in the course " **Probability and Numerical Analysis** ", • to use exclusively his/her institutional account for his/her participation in the video conferencing platform and for his entry in eclass, • to shows his / her student ID before the start of the examination or whenever requested. ➢ Digital platforms to be used: • simultaneous use of Microsoft Teams and platform eclass ➢ Required technological equipment: • Ability to connect to the internet, • use of camera, speakers, microphone, • ability to scan / photograph the manuscript and create a PDF file, • ability to read a GIF (photo) file. ➢ Throughout the exam, the students are connected to Microsoft Teams with an open camera and microphone so that there is seamless visual and audio contact between examiner and examinee. At the same time, they must be able to connect to the eclass to read the exam questions and upload the answers. ➢ For the written examination the examinees have • To read the examination test that will be posted in eclass in the "Tasks" or in the "Exercises" of the course, • To write their answers on an A4 paper, to digitize it (scan / photograph), to create a PDF file and to upload it to eclass ➢ For the oral examination • the students initially are waiting in the lobby, • the students are inserted into the virtual room (Microsoft Teams) one by one. • 3-4 questions will be asked. • The examination will take about 5 minutes (for each one).	