COURSE OUTLINE

1. GENERAL

SCHOOL	FACULTY OF ENGINEERING		
DEPARTMENT	ENVIRONMENTAL ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	15ZY3N - K1	**SEMESTER**	**8th**
COURSE TITLE	STATISTICS II- EXPERIMENTAL DESIGN AND OPTIMIZATION. TIME SERIES ANALYSIS.		

TEACHING ACTIVITIES *If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits.*	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
	6	5
Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.		

COURSE TYPE *Background, General Knowledge, Scientific Area, Skill Development*	Skill Development
PREREQUISITES:	Mathematics, Statistics I, Atmospheric Chemistry, Atmospheric Physics
TEACHING & EXAMINATION LANGUAGE:	Greek
COURSE OFFERED TO ERASMUS STUDENTS:	NO
COURSE URL:	https://eclass.duth.gr/courses/TMC343/

2. LEARNING OUTCOMES

Learning Outcomes
Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.

1. Knowledge based

Experimental design and optimization

- *Randomization and blocking*
- *Two-way ANOVA*
- *Latin squares and other designs*
- *Interactions*
- *Factorial versus one-at-a-time design*
- *Factorial design and optimization*
- *Optimization: basic principles and univariate methods*
- *Optimization using the alternating variable search method*
- *The method of steepest ascent*
- *Simplex optimization*
- *Simulated annealing*
- *Time series analysis*

2. Skills / Competences acquired

   Students will be able to design an experiment and analyze the data.

General Skills	
Name the desirable general skills upon successful completion of the module	
Search, analysis and synthesis of data and information, ICT Use	*Project design and management*
Adaptation to new situations	*Equity and Inclusion*
Decision making	*Respect for the natural environment*
Autonomous work	*Sustainability*
Teamwork	*Demonstration of social, professional and moral responsibility and sensitivity to gender issues*
Working in an international environment	*Critical thinking*
Working in an interdisciplinary environment	*Promoting free, creative and inductive reasoning*
Production of new research ideas	

Search, analysis and synthesis of data and information,
ICT Use
Working in an international environment
Working in an interdisciplinary environment
Project design and management
Critical thinking

3. COURSE CONTENT

- Methods for constructing and analyzing designed experiments are considered.
- Concepts of experimental unit, randomization, blocking, replication, and orthogonal contrasts are introduced.
- Designs include completely randomized design, randomized complete block design, Latin squares design, split-plot design, repeated measures design, and factorial and fractional factorial designs.
- Methods for analysis of environmental data are considered focusing in time series analysis.

4. LEARNING & TEACHING METHODS - EVALUATION

TEACHING METHOD *Face to face, Distance learning, etc.*	Face to face
USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT) *Use of ICT in Teaching, in Laboratory Education, in Communication with students*	**Use of ICT during teaching and communication with students**

TEACHING ORGANIZATION *The ways and methods of teaching are described in detail.* *Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research & analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.* *The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.*		
	Activity	*Workload/semester*
	Lectures	40
	Lab Exercises	40
	Reading and studying	70
	Class total	150

STUDENT EVALUATION *Description of the evaluation process*	
	The course is evaluated by:

Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Presentation in audience, Laboratory Report, Clinical examination of a patient, Artistic interpretation, Other/Others Please indicate all relevant information about the course assessment and how students are informed	Laboratory exercises (40%) Written examination (60%)

5. SUGGESTED BIBLIOGRAPHY

1. E-book « Statistics II» Spyridon Rapsomanikis, available in the e-class.
2. J. N. Miller, J. C. Miller "Statistics and Chemometrics for Analytical Chemistry" Pearson Education, 2005
3. "Laboratory exercises", G. Loupa, available in the e-class.

ANNEX OF THE COURSE OUTLINE

Alternative ways of examining a course in emergency situations

Teacher (full name):	Glykeria Loupa
Contact details:	gloupa@env.duth.gr
Supervisors:	YES
Evaluation methods:	Written examination with distance learning methods
Implementation Instructions:	The examination in the course will take place on the day defined by the Program of the Department. The topics will be posted in the e-class. In the Word file of the topics that each student will "download", he will write his answers. Each of them will post this file in the "Assignments" section of the e-class. This approach is exactly the same as the way students' homework is done. The test will be performed via Teams. The link will be sent́ to students via e-class exclusivelý to the institutional accounts of those who have registered for the course and have accepted the terms of the distance examination. Students must log in to the examination room through their institutional account. Otherwise, they will not be able to participate. They will also take part in the examination with a camera which they will have open during the examination. Before the start of the exam, students will show their academic ID to the camera, so that they can be identified. Any question will be asked through a microphone. They should also make sure that the issues are processed on a desktop or laptop and not on a tablet or mobile.