COURSE OUTLINE

1. GENERAL

SCHOOL	School of Engineering		
DEPARTMENT	Department Of Environmental Engineering		
LEVEL OF STUDIES			
COURSE CODE	**ΓΖΥΠ**	**SEMESTER**	**2**
COURSE TITLE	**Fluid Mechanics**		

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**
	4	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*	Background, general knowledge
PREREQUISITES:	Mathematics I
TEACHING & EXAMINATION LANGUAGE:	Greek
COURSE OFFERED TO ERASMUS STUDENTS:	No
COURSE URL:	https://eclass.duth.gr/courses/TMC132/

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.

- Understanding the principles of dimensional analysis
- Understanding the principles of kinematics (Euler and Lagrange description of flows0
- Understanding of the structure, the physical significance and the applications of the Navier-Stokes equations
- Understanding of the methods of solving the Navier-Stokes equations
- Understanding the applications of Fluid Mechanics to solving Engineering problems

General Skills

Name the desirable general skills upon successful completion of the module

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

Decision making
Autonomous work
Project design and management
Critical thinking

Learn to use charts, diagrams and tables for Engineering problems

Learn to use fluid mechanics problems for Engineering applications
Learn to evaluate flow characteristics and their implications to Engineering problems

3. COURSE CONTENT

1. Introduction. Fundamental concepts of fluid mechanics
2. Dimensional Analysis. Theory and Exercises
3. Fluid kinematics. Theory
4. Fluid kinematics. Exercises
5. Fluid dynamics. The Navier Stokes equations
6. Analytical solutions of the Navier Stoked equations (Hele-Shaw flow, Poiseuille flow)
7. Applications of the Navier-Stokes equatioms
8. Boundary layer theory
9. The Bernoulli equation and its applications
10. Hydraulic experimental models
11. Simulations of turbulent flows
12. Forces induced by fluid flows on solid bodies
13. Hydrostatics

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 in Teaching, in Laboratory Education, in 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.*	
STUDENT EVALUATION *Description of the evaluation process* *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*	Course evaluation is based on the final exam

Activity	*Workload/semester*
Lectures	50
Exercises	15
Study of the literature	45
Exercises at home	40

5. SUGGESTED BIBLIOGRAPHY

Munson, B.R., Young, D.F., Okiishi, T.H.,. Wiley (1998) «*Fundamentals of Fluid Mechanics*»,
Streeter, V.L, E. B. Wylie (2009) «*Fluid mechanics*». Fountas Editions. In Greek
Kotsovinos (2008) *Fluid Mechanics* Spanidis Editions. In Greek

Prinos P. (2014) *Fluid Mechanics*. Ziti Editions. In Greek

ANNEX OF THE COURSE OUTLINE

Alternative ways of examining a course in emergency situations

Teacher (full name):	Konstantinos Moutsopoulos
Contact details:	kmoutso@env.duth.gr
Supervisors: (1)	
Evaluation methods: (2)	Written and oral examination
Implementation Instructions: (3)	

(1) Please write YES or NO

(2) Note down the evaluation methods used by the teacher, e.g.

- *written assignment* or/and exercises
- written or oral examination with distance learning methods, provided that the integrity and reliability of the examination are ensured.

(3) In the **Implementation Instructions** section, the teacher notes down clear instructions to the students:

a) in case of **written assignment and / or exercises:** the deadline (e.g. the last week of the semester), the means of submission, the grading system, the grade percentage of the assignment in the final grade and any other necessary information.

b) in case of **oral examination with distance learning methods:** the instructions for conducting the examination (e.g. in groups of X people), the way of administration of the questions to be answered, the distance learning platforms to be used, the technical means for the implementation of the examination (microphone, camera, word processor, internet connection, communication platform), the hyperlinks for the examination, the duration of the exam, the grading system, the percentage of the oral exam in the final grade, the ways in which the inviolability and reliability of the exam are ensured and any other necessary information.

c) in case of **written examination with distance learning methods**: the way of administration of the questions to be answered, the way of submitting the answers, the duration of the exam, the grading system, the percentage of the written exam of the exam in the final grade, the ways in which the integrity and reliability of the exam are ensured and any other necessary information.

There should be an attached list with the Student Registration Numbers only of students eligible to participate in the examination.