COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Technology		
ACADEMIC UNIT	Department of Environmental Sciences		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**AY302**	**SEMESTER**	**3rd**
COURSE TITLE	**FLUID MECHANICS**		
INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**	
Teaching Hours	4	4	
COURSE TYPE	General background		
PREREQUISITE COURSES	None		
LANGUAGE OF INSTRUCTION and EXAMINATIONS	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBSITE (URL)	https://eclass.uth.gr/courses/ENV_U_109/		

(2) LEARNING OUTCOMES

Learning outcomes

The course objective is to expose students to the basic methodology of solving problems related to fluids in equilibrium or in motion, such as: calculation of hydrostatic forces on plane or curved submerged surfaces in stationary liquids, the calculation of the various parameters in the flow field of real or ideal fluids, control volume analysis of fluid motion, the calculation of laminar viscous flow in simple geometries, as well as an introduction to turbulent flows and boundary-layer theory.

Upon successful completion of the course, students will have acquired the necessary knowledge, skills and competence, and will be able to:

- Apply the knowledge acquired to courses of following semesters, related to the management of coastal systems, the mathematical modeling of environmental systems, the management of toxic and hazardous waste, the contemporary methods of monitoring environmental pollution, hydraulic projects - hydrological studies, etc.
- Apply the knowledge acquired in the course to solve environmental problems.

General Competences

- Search for, analysis and synthesis of data and information by the use of appropriate technologies
- Decision-making
- Working independently
- Team work
- Criticism and self-criticism
- Production of free, creative and inductive thinking
- Environmental awareness

(3) SYLLABUS

- Introduction. Properties of Fluids.
- Hydrostatics.
- Advanced Kinematics Concepts.
- Conservation of Mass. Streamfunction.
- Conservation of Momentum.
- Conservation of Energy.
- Integral Analysis of Fluid Motion.
- Inviscid Flow. Bernoulli Equation.
- Introduction to Potential Flow Theory.

- Introduction to Turbulence.
- Introduction to boundary Layer Theory.

(4) TEACHING and LEARNING METHODS – EVALUATION

DELIVERY	Face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	• Use of PowerPoint slides • View material in video • Visiting and using material from websites • Communication with students via e-mail • Use of asynchronous distance learning (e-class)
TEACHING METHODS	

Activity	***Semester workload***
Lectures	39
Laboratory practice	13
Study and analysis of bibliography	38
Essay writing and presentation preparing	10
Course total (25 hours workload per credit)	**100**

STUDENT PERFORMANCE EVALUATION	Students' performance is evaluated in the Greek language. The final grade is determined by: • A written exam (at the end of the semester) that contributes 70% to the final grade, applying one or more of the following evaluation methods: Multiple choice questions, short-answer questions, problem solving. • Student's participation in laboratory practice activities and the preparation and delivery of related written assignments (during the semester) that contribute 30% to the final grade. **Final Grade = 70% Exam Grade + 30% Assignments Grade**

(5) ATTACHED BIBLIOGRAPHY

- Ganoulis, J.G. (1982) *Introduction to Fluid Mechanics.* Thessaloniki: EPIKENTRO Publishers. (in Greek)
- Liakopoulos, A. (2019) *Fluid Mechanics,* (2nd ed). Thessaloniki: TZIOLA Publications. (in Greek)
- Noutsopoulos, G., Christodoulou, G. (1996) *Fluid Mechanics for Civil Engineers*. Athens: Foundas Publications. (In Greek)