(B) Course information in english

General course information:

Course title:	FLUID MECHANICS	**Course code:**	CE04_H04
Credits:	5	**Work load (hours):**	150
Course level:	Undergraduate ☑	Graduate ☐	
Course type:	Mandatory ☑	Elective ☐	
Course category:	Basic ☑	Orientation ☐	
Semester:	4th	**Hours per week:**	4

Course objectives (capabilities pursued and learning results):

The course objective is to expose the 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.

Prerequisites:

- Engineering Mechanics
- Calculus I and II
- Differential Equations

Instructor's data:

Name:	Antonios Liakopoulos
Level:	Professor
Office:	104-Department of Civil Engineering, Civil Engineering Faculty University of Thessaly Pedion Areos, 38334 Volos, Greece Office 104
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Other tutors:	-

Specific course information:

Week No.	Course contents	Hours	
		Course attendance	Preparation
1	**Introduction. Properties of Fluids**	**5**	**4**
2	**Hydrostatics I**	**5**	**5**
3	**Hydrostatics II**	**5**	**5**
4	**Streamlines. Pathlines**	**5**	**5**
5	**Advanced Kinematics Concepts**	**5**	**5**
6	**Conservation of Mass. Streamfuction**	**5**	**5**
7	**Conservation of Momentum I**	**5**	**5**
8	**Conservation of Momentum II. Navier Stokes Equation**	**5**	**5**
9	**Conservation of Energy**	**5**	**5**
10	**Integral Analysis of Fluid Motion**	**5**	**5**
11	**Inviscid Flow. Bernoulli Equation**	**5**	**5**
12	**Introduction to Potential Flow Theory**	**5**	**5**
13	**Introduction to Turbulence**	**5**	**4**
14	**Introduction to boundary Layer Theory**	**5**	**4**

Additional hours for:			
Class project	**Examinations**	**Preparation for examinations**	**Educational visit**
	3	10	

Suggested literature:

- Liakopoulos A., 2011. *Fluid mechanics.* Tziolas Publications. Thessaloniki. (in greek)
- Noutsopoulos, G., and Christodoulou, G., 1996. *Fluid mechanics for Civil Engineers.* NTU Athens. (In Greek)

- Ganoulis, J.G., 1982. *Introduction to fluid mechanics.* Thessaloniki. (in greek)
- Fox & McDonald 1998. *Introduction to Fluid Mechanics.* Wiley.
- F. M. White 1986. *Fluid Mechanics.* McGraw-Hill.
- Demetriou, J.D., 1997. *Fluid mechanics, Volume 1 - Introduction.* Athens. (in greek)
- Demetriou, J.D., 1997. *Fluid mechanics, Volume 2 - Applications.* Athens. (in greek)
- Kotsovinos, N.E., 1983. *Hydraulics, Volume I.* Xanthi. (in greek)
- Papaioannou, A., 1996. *Fluid mechanics, Volumes I and II.* Athens. (in greek)
- Tsangaris, S., 1995. *Mechanics of fluids*. Symeon Editions, Athens. (in greek)
- Rouse, H, 1961. *Fluid mechanics for hydraulic engineers*. Dover.
- Streeter, VL, 1961. *Handbook of fluid dynamics.* McGraw-Hill.
- Van Dyke, M, 1982. *An album of fluid motion*. Parabolic Press.

Teaching method *(select and describe if necessary -* **weight***):*		
Teaching	☑	90 %
Seminars	☐	…….%
Demonstrations	☑	……. %
Laboratory	☑	5 %
Exercises	☐	.....%
Visits at facilities	☐	5 %
Other *(describe):* …….	☐	…….%
Total		100%

Evaluation method *(select)*- **weight:**				
	written	*%*	*Oral*	*%*
Homework	☐		☐	
Class project	☐		☐	
Interim examination	☐		☐	
Final examinations	☑	100	☐	
Other *(describe):* ……	☐		☐	