

COURSE ID SHEET



Course No. **5299**

NTUA

Semester: **9** Core Elective Specialization **X**

Title: **ADVANCED FLUID MECHANICS**

Aim: The course is of postgraduate level and its main goal is to introduce and elaborate on methods of analysis from basic principles of flow of fluids and their application in a wide range of spatial scales, from cellular to atmospheric. Primary aim of the course is the connection of the mathematical formulation with the physical understanding of the flow. The course presumes on basic undergraduate courses, such as Transport Phenomena I: Fluid Mechanics, Transport Phenomena II: Heat and Mass Transport; also, on courses which refer to fluid flow phenomena and processes, such as Electro-Mechanical Process Equipment, Physical Process Engineering, Chemical Process Engineering.

Content:

- Elements of vector and tensor calculus and continuum mechanics.
- Kinematics.
- Differential analysis of flow.
- Boundary layer flow.
- Interfacial fluid mechanics. Flows of low Reynolds number.
- Turbulent flow.
- Similarity theory
- Dimensional analysis

Hours per semester:	LECTURE	40	EXERCISES	-	LABORATORY	-	HOME-WORK	135	TOTAL HOURS: 175
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Student performance /evaluation: The final grade derives from the final (written) examination and from the theoretical and computational exercises during the semester. The grades of the final (written) examination and the exercises contribute equally (50%) to the final grade.