

## Course Syllabus

1. Course number and name: 020CIFNI4 Fluid Kinematics
2. Credits and contact hours: 2 ECTS credits, 1 × 1: 15 course hours
3. Instructor's or course coordinator's name: Hagop TAWIDIAN
4. Textbook: *Physique tout-en-un PC, Salamito, J'intègre-Dunod, 2013*
5. Specific course information

Catalog description:

Flow visualization, lines of flow, Types of flow- steady, unsteady, uniform, non-uniform, laminar, turbulent, velocity field and acceleration, continuity equation, Navier-Stokes equation, Equation of streamline, stream function, velocity potential function, circulation, flow net, Vorticity, irrotational and rotational flow, compressible and incompressible flows, Lagrangian and Eulerian Description.

- a. prerequisites: Hydrostatics
- b. Required/Elective/Selected Elective: Required

6. Specific goals for the course specific outcomes of instruction
  - Understand the type of flows
  - Explain the Lagrangian and Eulerian perspectives to fluid flow problems
  - Review and understand the continuity equations for viscous, incompressible fluids.
  - Understand vorticity and circulation concepts and theorems.
  - Understand and utilize approximate solutions of the Navier-Stokes equation.
  - Calculate the motion of a fluid particle (kinematics) including translation (particle acceleration), rotation (vorticity), angular deformation (proportional to shear stress), and linear deformation (volume dilation rate).

b. KPIs addressed by the course:

KPI	a1	a2	b1	b2	b3
Covered	x		x		
Assessed	x				
Give Feedback	x				

7. Topics and approximate lecture hours:
  - Type of flows (2 Lecture)
  - Continuity equation, Navier-Stokes equation, Equation of streamline (3 Lectures)
  - Stream function, velocity potential function, circulation, flow net (3 Lectures)
  - Vorticity, irrotational and rotational flow, compressible and incompressible flows (3 Lectures)
  - Lagrangian and Eulerian Description. (3 Lectures)