

Fluid Mechanics

Fluid mechanics

IDENTIFICATION

CODE : GMCIP-3-S2-EC-FLUID
ECTS : 3.0

HOURS

Lectures : 21.0 h
Seminars : 23.0 h
Laboratory : 12.0 h
Project : 0.0 h
Teacher-student
contact : 56.0 h
Personal work : 34.0 h
Total : 90.0 h

ASSESSMENT METHOD

In-class exams [1h] + Final exam [2h]

TEACHING AIDS

Digital pdf class notes; Exercice and laboratory paper folders

TEACHING LANGUAGE

French

CONTACT

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AIMS

Master mass, momentum and energy balances in fluid mechanics and apply them to basic issues for calculating flow rates, velocity, pressure, forces and head loss.
Know how to design fluid networks, selecting appropriate components (pipes, fittings, pumps,).
Compute forces applied on immersed bodies moving within incompressible fluids (vehicle, airfoil, projectile)

CONTENT

Identify fluid properties. Establish force and momentum balances for moving fluids or at rest. Apply Bernoulli's equation for a perfect fluid. Define flow kinematic properties (material derivative, Streamlines, streaklines and pathlines). Write the Differential Relations for a Fluid Particle (continuity and Navier-Stokes) and associated boundary conditions. Calculate pipe and minor head loss. Exploit the system and pump performance curves to select the proper pump for a particular application. Evaluate the risk of cavitation. Calculate fluid force applied on solids.

BIBLIOGRAPHY

BATCHELOR,G.K., An Introduction to fluid dynamics, Cambridge University Press, 2000 [réed.]