



ADVANCED HYDRAULICS	
Enrollment year	2019/2020
Academic year	2019/2020
Regulations	DM270
Academic discipline	ICAR/01 (HYDRAULICS)
Department	DEPARTMENT OF CIVIL ENGINEERING AND ARCHITECTURE
Course	ENVIRONMENTAL ENGINEERING
Curriculum	PERCORSO COMUNE
Year of study	1°
Period	2nd semester (02/03/2020 - 12/06/2020)
ECTS	6
Lesson hours	50 lesson hours
Language	Italian
Activity type	ORAL TEST
Teacher	SIBILLA STEFANO (titolare) - 6 ECTS
Prerequisites	Fundamentals of calculus and mechanics. Fluid mechanics and basic hydraulics (pipe flows, open channel flows)
Learning outcomes	At the end of the Course, the student will acquire the fundamental theoretical concepts and mathematical tools for the analysis of relevant problems in the hydraulic engineering field, such as: filtration flows in porous media, transient flows (water hammer, flood waves), stationary hydrodynamic forces on surfaces, turbulent flows.
Course contents	Theory of turbulence: instability, turbulence scales, Reynolds averaged equations. Wall turbulence: velocity profiles. Applications to turbulent flows in pipes and open channels. Hydrodynamic forces: drag, lift, hydrodynamic coefficients. Application of the global momentum equation to the evaluation of hydrodynamic forces. Non-stationary hydraulic problems: water hammer, method of

	characteristics. Filtration flows in porous media.
Teaching methods	Lectures and practical classes
Reccomended or required readings	Citrini D., Nosedà D., Idraulica. CEA, Milano 1987 Tennekes H., Lumley J.L., A first course in turbulence, MIT Press 1972
Assessment methods	Oral exam on problems proposed during practical classes, with discussion of related theoretical aspects
Further information	
Sustainable development goals - Agenda 2030	\$lbl legenda sviluppo sostenibile