UNIVERSITÀ DI PAVIA

Anno Accademico 2021/2022

HYDRAULIC MEASUREMENT

Enrollment year	2020/2021
Academic year	2021/2022
Regulations	DM270
Academic discipline	ICAR/02 (MARITIME HYDRAULIC CONSTRUCTION AND HYDROLOGY)
Department	DEPARTMENT OF CIVIL ENGINEERING AND ARCHITECTURE
Course	ENVIRONMENTAL ENGINEERING
Curriculum	Energie rinnovabili
Year of study	2°
Period	2nd semester (07/03/2022 - 17/06/2022)
ECTS	3
Lesson hours	35 lesson hours
Language	Italian
Activity type	ORAL TEST
Teacher	PERSI ELISABETTA (titolare) - 3 ECTS
Prerequisites	The Course deals with theoretical and application matters chiefly referred to the Teaching Fields of Hydraulic and Fluid Mechanics. It is useful for the students a preliminary frequency of the teaching Matters above mentioned, for an easier understanding of the object of the Course.
Learning outcomes	Show the methodologies used to perform laboratory and field measurements of hydraulic variables like pressure, velocity, discharge, water level. Laboratory and field application of some of the methodologies learnt in the course.
Course contents	Introduction Theory of measurements, dimensions, errors definition and their statistical analysis.

	Pressure measurements Manometry and use of pressure transducers in dynamic measurements. Velocity measurements Measures based on mechanical principles (Pitot tube, vane anemometer); measures based on optical principles (laser anemometer (LDV) and its application to turbulence measurements); outline of PIV measurements. Ultrasonic techniques. Water level and velocity measurements in free surface flow Velocity measurements based on mechanical principles (use of current meter and their calibration); ultrasonic measurements. Measure of discharge in open channels Hydraulic measurements (weirs, broad crested weirs); discharge determination through local velocity measurements; discharge measurements using ultrasonic techniques. Discharge measurements in pipes Recall of traditional techniques and their applications (e.g. Venturi Tube); ultrasonic flowmeters. Outline of hydraulic physical models and of measurement of the hydrodynamic coefficients.
Teaching methods	Lectures (hours/year in lecture theatre): 17 Practical class (hours/year in lecture theatre): 18 Practicals / Workshops (hours/year in lecture theatre): 0
Reccomended or required readings	S. Longo, M. Petti, Misure e controlli idraulici, ed. McGraw- Hill T. Arts, H. Boerrigter, M. Carbonaro, J.M. Charbonnier, G. Degrez, D. Olivari, M.L. Riethmuller, R.A. Van den Braembussche, Measurement techniques in fluid dynamics: an introduction, Von Karman Institute for Fluid Dynamics Course lecture notes available on KIRO (in italian)
Assessment methods	Oral exam including the assessment of the hydraulic basic knowledge, the discussion of the report on the measurements performed during the course, the theory taught.
Further information	Oral exam including the assessment of the hydraulic basic knowledge, the discussion of the report on the measurements performed during the course, the theory taught.
Sustainable development goals - Agenda 2030	$lbl_legenda_sviluppo_sostenibile