



# UNIVERSITÀ DI PAVIA

Anno Accademico 2015/2016

| HYDRAULIC MEASUREMENT |                                                                                                                                                                                                                                                                                                                                           |
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| Enrollment year       | 2014/2015                                                                                                                                                                                                                                                                                                                                 |
| Academic year         | 2015/2016                                                                                                                                                                                                                                                                                                                                 |
| Regulations           | DM270                                                                                                                                                                                                                                                                                                                                     |
| Academic discipline   | ICAR/01 (HYDRAULICS)                                                                                                                                                                                                                                                                                                                      |
| Department            | DEPARTMENT OF CIVIL ENGINEERING AND ARCHITECTURE                                                                                                                                                                                                                                                                                          |
| Course                | ENVIRONMENTAL ENGINEERING                                                                                                                                                                                                                                                                                                                 |
| Curriculum            | IMPIANTISTICO                                                                                                                                                                                                                                                                                                                             |
| Year of study         | 2°                                                                                                                                                                                                                                                                                                                                        |
| Period                | 2nd semester (29/02/2016 - 10/06/2016)                                                                                                                                                                                                                                                                                                    |
| ECTS                  | 3                                                                                                                                                                                                                                                                                                                                         |
| Lesson hours          | 23 lesson hours                                                                                                                                                                                                                                                                                                                           |
| Language              | ITALIAN                                                                                                                                                                                                                                                                                                                                   |
| Activity type         | WRITTEN AND ORAL TEST                                                                                                                                                                                                                                                                                                                     |
| Teacher               | PETACCIA GABRIELLA (titolare) - 3 ECTS                                                                                                                                                                                                                                                                                                    |
| Prerequisites         | The Course of 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. Application of the methodologies learnt in the course to perform filed measurements.                                                                                                     |
| Course contents       | Introduction. Theory of measurements, errors definition. Statistical analysis of the results. Pressure measurements. Use of pressure transducers in dynamic measurements. Velocity measurements. Measures based on mechanical principles: Pitot tube. Measures based on optical principles: laser anemometer (LDA) and its application to |

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|                                                    | 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 velocity measurements. Discharge measurements using ultrasonic techniques. Discharge measurements in pipes. Recall of traditional techniques and their applications ( e.g. Venturi Tube) |
| <b>Teaching methods</b>                            | Lectures (hours/year in lecture theatre): 23<br>Practical class (hours/year in lecture theatre): 0<br>Practicals / Workshops (hours/year in lecture theatre): 0                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Reccomended or required readings</b>            | S. Longo, M. Petti. . Misure e controlli idraulici. . McGraw-Hill, 2006..                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Assessment methods</b>                          | Oral exam including the discussion of the report on the measurements performer during the course                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Further information</b>                         | Oral exam including the discussion of the report on the measurements performer during the course                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Sustainable development goals - Agenda 2030</b> | <a href="#">\$ibl_legenda_sviluppo_sostenibile</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |