Percorso Autonomo Autorizzato

Title (Titolo)	**Hydraulic Engineering (Idraulica)**
Chief (Referente responsabile)	**(**DICA, PoliMi): prof. Stefano Malavasi
Supporting Coordinators (Altri referenti)	**(**DICA, PoliMi): prof. Francesco Ballio **(**DIS, PoliMi): prof. Alberto Taliercio
Scientific collaborations and partnerships (Collaborazioni scientifiche nazionali ed internazionali)	· (DMEC, PoliMi): prof. Fabio Fossati, prof. Emanuele Zappa, prof. Alfredo Cigada · (DICA, PoliMi): prof. Federico Perotti, prof. Raffaele Ardito · (DMAT, PoliMi): prof. Simona Perotto; prof. Luca Formaggia · (DICATeCh, PoliBa): prof. Umberto Fratino · (Norwegian University of Science and Technology, Trondheim): prof. Helge I. Andersson, prof. Pettersen Bjørnar, Tufan Arslan PhD · (University of Aberdeen, Scotland): prof. Vladimir Nikora · (Cham Ltd, London): dr. Mike Malin · (University of Victoria, Canada): prof. Peter Oshkai · (University of Arizona): prof. S. P. Neuman · (Imperial College Londo): prof. M. Blunt · (UPC of Barcelona): prof. X. Sanchez-Vila
Description and goals (Descrizione ed obiettivi)	The student of Mathematical Engineering, with a curriculum similar to that in the "Computational Science" track, will acquire skills which are typical of the students of the Civil Hydraulic Engineering curriculum. The student will also have the opportunity of getting a second master's degree after an additional year of study within which he/she will gain improved knowledge on construction-related issues which are key to a civil hydraulic engineer. The objective of this track is to create a professional profile with high proficiency in computational tools and fitting the Civil Hydraulic Engineering field consistent with the growing needs for applied numerical modelling skills.
Study Plan (Piano di studi)	The study program is analog to that of the "Computational Science" track of the M.Sc. in Mathematical Engineering with additional courses providing the basis of ground-water and surface-water hydraulics. The list of courses can be found in a separate document.
Past MSc theses (Alcune Tesi discusse)	▪ I. Ingrosso, *Una strategia per lo studio dell'erosione con modelli Euler-Euler*, 2014 ▪ L. Oldani, *Implementazione di un modello per la previsione dell'emissione acustica in dispositivi di regolazione*, 2014 ▪ F. Agresti, *Upscaling e permeabilità per flussi bifase in mezzi porosi*, 2014 ▪ L. Fenini, *Previsione dell'emissione acustica in dispositivi idraulici*, 2015
Available subjects for a MSc thesis (Tesi disponibili)	· *V.I.V. of oscillating structures (numerical / experimental)* · *Energy recovery from water systems (numerical / experimental)* · *Modeling of the fluid dynamic noise in control valves (numerical / experimental)* · *Modeling of the impact wear of pipeline components (numerical)* · *Modeling of the multiphase flow in porous media (numerical)* · *Geostatistical upscaling of hydraulic processes (numerical)* and other topics can be agreed with the students.
Internships (Tirocini)	Various internal and external stages have been set up in recent years. In most cases these were linked to the theses simultaneously or subsequently developed. Recent stages were held at: University of Aberdeen; UPC Barcelonatech (Barcelona); CNRS Strasburgo; CESI Ricerca; Pibiviesse srl; Breda Energia Spa; ARPA Bologna.
Job opportunities (Sbocchi lavorativi)	Private companies and public institutions where fluid mechanics and computational hydraulics play a strategic role for the development, control, and management of processes and products.

DD Mathematical Engineering - Civil Engineering (Doppia Laurea Magistrale Interna)	The student following the Hydraulic Engineering curriculum will have the possibility to enter in the double degree curriculum "Mathematical Engineering + Civil Engineering". With an additional year of study, the Graduate in Mathematical Engineering will obtain the degree in Civil, Hydraulic Engineering; details can be found at: http://www.ingindinf.polimi.it/didattica/doppie-lauree-interne/