



HYDRAULIC MACHINES	
Enrollment year	2020/2021
Academic year	2021/2022
Regulations	DM270
Academic discipline	ING-IND/08 (FLUID MACHINES)
Department	DEPARTMENT OF CIVIL ENGINEERING AND ARCHITECTURE
Course	CIVIL ENGINEERING
Curriculum	Idraulico
Year of study	2°
Period	1st semester (27/09/2021 - 21/01/2022)
ECTS	3
Lesson hours	28 lesson hours
Language	Italian
Activity type	WRITTEN AND ORAL TEST
Teacher	BARBERO GIUSEPPE - 3 ECTS
Prerequisites	Mass conservation, energy conservatio, momentum conservation equations. Pipe flow: Bernoulli theorem, friction loss, head loss, ecc. Basic knowledge of relative motion.
Learning outcomes	The aim of the hydraulic machines course is to illustrate the main constructional and operational characteristics of the machines operating with incompressible fluids (pumps and hydraulic turbines) of major industrial interest. Particular attention is paid to the criteria for the choice of the machines, to the methods of regulation and to the interaction between machine and plant, in order to optimize their use.
Course contents	Hydraulic machines: pumps and turbines General principles Principles of conservation of mass, momentum and energy. Adiabatic motion of incompressible fluids in the variable section

	<p>ducts. Relative motions, Euler equation.</p> <p>Hydraulic pumps Classification, fields of operation and selection criteria of the pumps. Operating quantities of the pumps: prevalence, efficiency and nominal power. Pump-system interaction, pump and system characteristic curves. Coupling of pumps in series and parallel. Operation in off-project conditions. Cavitation in the pumps, NPSH required. Hydraulic similarity. Dependency of the geometry of the machine with the required performances.</p> <p>Hydraulic turbines General information on hydroelectric plants and storage systems. The Pelton, Francis and Kaplan turbines: operational characteristics and selection criteria.</p>
Teaching methods	<p>Frontal lessons (hours/years): 16 Exercises (hours/years): 12 Practical activities (hours/years): 0</p>
Recommended or required readings	<p>Lecture notes by the teacher</p> <p>G. Cornetti. Macchine Idrauliche. Il Capitello - Torino.</p> <p>Dossena, G. Ferrari, P. Gaetani, G. Montenegro, A. Onorati, G. Persico MACCHINE A FLUIDO Seconda edizione CittàStudi Milano</p>
Assessment methods	<p>The course final exam consists of a written test and an oral exam (usually the day after the written test) to be held on the scheduled dates.</p>
Further information	<p>=</p>
Sustainable development goals - Agenda 2030	<p><a href="#">\$lbl legenda sviluppo sostenibile</a></p>