UNIVERSITÀ DI PAVIA

Anno Accademico 2021/2022

MACHINES

Enrollment year	2019/2020
Academic year	2021/2022
Regulations	DM270
Academic discipline	ING-IND/08 (FLUID MACHINES)
Department	DEPARTMENT OF ELECTRICAL,COMPUTER AND BIOMEDICAL ENGINEERING
Course	INDUSTRIAL ENGINEERING
Curriculum	Meccanica
Year of study	3°
Period	1st semester (27/09/2021 - 21/01/2022)
ECTS	6
Lesson hours	45 lesson hours
Language	Italian
Activity type	ORAL TEST
Teacher	FERRARI MARIO LUIGI - 6 ECTS
Prerequisites	Knowledge of mathematics and physics. Basic knowledge of applied physics (thermodynamics, fluid dynamics, hydraulics, etc.).
Learning outcomes	The aim of the course is the presentation of the main construction and operative features of fluid machines of large industrial interest. Special attention is devoted to machine choice, regulation details, and machine-plant interaction aspects to optimize their performance. Moreover, the main power plants will be analysed considering their applications, performance and operative conditions.
Course contents	General aspects Introduction to the course and the machine study. Hydraulic elements. Hydraulic operating machines. Basic concepts, classification, working conditions and pump choice criteria. Alternative and centrifugal pumps. Other systems.

	Hydraulic turbines. Hydraulic energy utilization. General aspects on the hydroelectric plants. Impulse and reaction turbines. Other turbines. Thermal machines Thermodynamic aspects and cycles. Steam turbines Steam power plants. Impulse and reaction steam turbines. Gas turbines Alternative and rotating compressors. Cogeneration plants and combined cycles. Aspects of internal combustion engines
Teaching methods	Lessons (hours/year in classroom): 45. Exercises (hours/year in classroom): 0. Practical experiences (hours/year in classroom): 0
Reccomended or required readings	All the slides used during the lessons and other teaching material will be available. In general, lesson notes and slides will be enough to prepare the exam. These books are suggested as support: - O. Acton, C. Caputo, "Macchine a fluido", UTET - R. Della Volpe, “Macchine”, Liguori Editore
Assessment methods	The exam will be based on oral questions that could be performed with a writing support (blackboard or a sheet of paper). Details on the exam preparation will be presented during the lessons. The exam aim will consider not only the evaluation of the knowledge level, but also if the student acquired analysis knowledge for energy system problems to be presented with a correct terminology. The student will be asked to design the plant schemes, analyse the behaviour in the main thermodynamic plans and to develop design calculations in agreement with what presented during the lessons.
Further information	---
Sustainable development goals - Agenda 2030	The goals