



# UNIVERSITÀ DI PAVIA

Anno Accademico 2018/2019

## MACHINES AND MACHINE DESIGN

|                 |   |
|-----------------|---|
| Enrollment year | 2016/2017   |
| Academic year   | 2018/2019   |
| Regulations     | DM270   |
| Department      | DEPARTMENT OF ELECTRICAL, COMPUTER AND BIOMEDICAL ENGINEERING |
| Course          | INDUSTRIAL ENGINEERING  |
| Curriculum      | Meccanica   |
| Year of study   | 3°  |
| Period          | Annual (01/10/2018 - 14/06/2019)                              |
| ECTS            | 12  |
| Language        | Italian   |

The activity is split

502475 - MACHINE DESIGN

502468 - MACHINES



## MACHINE DESIGN

|                                  |   |
|----------------------------------|---|
| Enrollment year                  | 2016/2017   |
| Academic year                    | 2018/2019   |
| Regulations                      | DM270   |
| Academic discipline              | ING-IND/14 (MECHANICAL DESIGN AND MACHINE BUILDING)           |
| Department                       | DEPARTMENT OF ELECTRICAL, COMPUTER AND BIOMEDICAL ENGINEERING |
| Course                           | INDUSTRIAL ENGINEERING  |
| Curriculum                       | Meccanica   |
| Year of study                    | 3°  |
| Period                           | 2nd semester (06/03/2019 - 14/06/2019)                        |
| ECTS                             | 6   |
| Lesson hours                     | 45 lesson hours   |
| Language                         |   |
| Activity type                    | WRITTEN AND ORAL TEST   |
| Teacher                          | SANGIRARDI MICHELE - 6 ECTS                                   |
| Prerequisites                    |   |
| Learning outcomes                |   |
| Course contents                  |   |
| Teaching methods                 |   |
| Reccomended or required readings |   |
| Assessment methods               |   |
| Further information              |   |
| Sustainable development          |   |





| MACHINES            |  |
|---------------------|--|
| Enrollment year     | 2016/2017  |
| Academic year       | 2018/2019  |
| 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 (01/10/2018 - 18/01/2019)   |
| ECTS                | 6  |
| Lesson hours        | 45 lesson hours  |
| Language            | Italian  |
| Activity type       | WRITTEN AND ORAL TEST  |
| Teacher             | FARNE' STEFANO (titolare) - 6 ECTS   |
| Prerequisites       | Knowledge of mathematics and physics. Basic knowledge of technical physics (thermodynamics, fluid dynamics, hydraulics, etc.)  |
| Learning outcomes   | <p>The aim of the course "Machines" is to illustrate the main building and operating characteristics of the fluid machines of major industrial interest. Particular attention is devoted to the selection criteria of the machines, to the regulation criteria and to the interaction plant-machine in order to their optimal use. The characteristics of the main energy production plants, their fields of application, their performance and operating conditions are synthetically analyzed.</p> |
| Course contents     | <p>General Principles. Introduction to the course and to the study of the machines.</p> <p>Elements of hydraulics</p>  |

|  |  |
|--|--|
|  | <p>Hydrostatics<br/> Hydrodynamics<br/> Channels and pipes<br/> Operating hydraulic machines<br/> Basic concepts, classification, operating ranges and criteria for selection of pumps. Reciprocating pumps. Centrifugal pumps. Other machines.</p> <p>Engine hydraulic machines<br/> Utilization of hydropower. Generalities on hydroelectric plants and storage systems. Hydraulic turbines. Impulse turbines. Reaction turbines. Other machines.</p> <p>Heat engines<br/> Elements of thermodynamics<br/> Thermodynamic cycles<br/> Steam turbines<br/> Steam-powered equipments. Impulse turbines. Reaction turbines.</p> <p>Gas turbines<br/> Operating machines<br/> Reciprocating compressors. Rotary compressors.</p> <p>Cogeneration and combined cycles.</p> |
| <b>Teaching methods</b>                            | <p>Lectures (hours/year in lecture theatre): 45<br/> Practical class (hours/year in lecture theatre): 0<br/> Practicals / Workshops (hours/year in lecture theatre): 0</p>   |
| <b>Reccomended or required readings</b>            | <p>The textbook consists of the lecture notes of the professor</p>   |
| <b>Assessment methods</b>                          | <p>The exam consists of a written test (closed books) divided into two parts: theory and exercises. To pass the exam, it is necessary to obtain a sufficient evaluation in both parties. The final grade is the average of the marks obtained in the two parts (both sufficient).</p>  |
| <b>Further information</b>                         | <p>The exam consists of a written test (closed books) divided into two parts: theory and exercises. To pass the exam, it is necessary to obtain a sufficient evaluation in both parties. The final grade is the average of the marks obtained in the two parts (both sufficient).</p>  |
| <b>Sustainable development goals - Agenda 2030</b> | <p><a href="#">\$lbl legenda sviluppo sostenibile</a></p>  |