

Energy Field		Thermo fluids 2	Total of teaching hours : 92 hrs		
EN I3.6	3 ECTS credits		Course	Supervised work	Lab work
			36 hrs		24 hrs
			4 hrs evaluation + 28 hrs individual work		

## Thermo fluids 2 : Fluid Mechanics 2 – Heat transfers and Heat Exchangers

### Objectives

This second part of the teaching on fluid mechanics is oriented toward both the theoretical and practical training of the engineer, this is an opportunity to develop a critical mind and useful reasoning in the practice of the profession of engineer. The practical sessions proposed aim to familiarise the student with the instrumentation in fluid mechanics. In heat transfers the goal is to acquire the knowledge and the basic principles of heat transfers to be able to understand and deal with situations related to heat.

### Prerequisites and links to other modules

- o Knowledge of operators and the basics of the vector analysis, mastery of double and triple integrals, partial differential equations, calculus, matrix operations, definition of units - MM 1.1.1 , M 1.1.2 , M 1.2.1 , and M 2.3.2
- o Thermodynamics and Thermal machines EN 3.5
- o Fluid mechanics EN 3.5
- o Thermodynamics of fluids in permanent discharge regime in EN 3.5

<b>Fluid mechanics 2</b>	<ul style="list-style-type: none"> <li>o Chap 6 : Aerodynamics of simple parts</li> <li>o Chap 7 : Compressible fluid dynamics, shock wave</li> <li>o Chap 8 : Dimensional analysis and physical similarity</li> </ul>
<b>Heat transfers and Heat exchangers</b>	<ul style="list-style-type: none"> <li>o Chap 1 : Conduction</li> <li>o Chap 2 : Convection</li> <li>o Chap 3 : Radiation</li> <li>o Chap 4 : Sizing of exchangers (OTLM, NUT methods)</li> <li>o Chap 5 : Instrumentations</li> </ul>

### Educational approaches and assessment methods

Lectures with supervised work.

Lab work fluid mechanics : Tests in wind tunnels, calculation of the  $C_x$  and the  $C_z$  for NACA wing profiles, linear and singular load loss studies, uses of the Venturi, the Diaphragm, the Rotameter and Overflow.

Lab work heat transfers : Conduction study. Convection study. Sizing of Exchangers.