BRES2105 Industrial physics

[37.5h+22.5h exercises] 5 credits

This course is taught in the 1st semester

Teacher(s):	Eddy Jacques, Hervé Jeanmart
Language:	French
Level:	Second cycle

Aims

At the end of the course, the student must be able :
- to apply the principles of thermodynamics to problems of industrial physics ;
- to describe the principles of burning and the energetic properties of fuels
- to understand the functioning of heat pumps and coolers
- to understand the functioning of fuel engines
- to describe the principles of combined production of heat and electricity- to describe the structure and principles of the functioning of electric machines and their applications
- to select a pump or a ventilator for a specific application

Main themes

- Principles of thermodynamics : entropy, enthalpy, power
- Thermodynamic cycles : Carnot cycle, transformation of gazes
- Humidity diagram
- Use of fuels. Heat capacity. Summary analysis
- Description of solid, liquid and gaseous fuels. Calculation of heat capacity in terms of composition. Chemical equation of combustion. Combustion control.
- Heat pump. Efficiency . Combined production of heat and cold.
- Functioning of fuel engines. Engine cycle. Combustion in constant volumes, under constant pressure and mixed. Comparison of theoretical and real cycles. Effective properties of fuel and gasoline engines. Characteristic curve. Octane index.
- Combined production of electricity and heat.
- Description, structure and principle functioning of some specific electrical machines and their application in production process, transport and use of electrical energy.
- Pumps and ventilators : description, characteristic curves and efficiencies

Programmes in which this activity is taught

BIR2	Bio-ingénieur
BRAS3DS	Diplôme d'études spécialisées en brasserie

Other credits in programs

BIR22/7A	Deuxième année du programme conduisant au grade de bio-ingénieur : Sciences agronomiques (Ressources en eau et en sol)	(5 credits)	
BIR22/7E	Deuxième année du programme conduisant au grade de bio-ingénieur : Sciences et technologie de l'environnement (Ressources en eau et en sol)	(5 credits)	
BRAS3DS	Diplôme d'études spécialisées en brasserie	(5 credits)	Mandatory