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CHIM1130 Chimie générale (2ème partie)

[30h+25h exercices] 4 credits

This course is taught in the 1st semester

**Teacher(s):** Jacques Vandooren  
**Language:** french  
**Level:** 1st cycle course

### Aims

The aim of this course is to teach the students essential knowledge in thermodynamics, thermochemistry and chemical equilibrium. Teaching will be accompanied with actual examples on chemical phenomena, either industrial, or based on human activity, or on the physiology of living creatures.

### Main themes

- Gas laws: perfect and real gases.
- Fundamentals in thermodynamics , intensive and extensive properties, interaction between a system and its surroundings, first law of thermodynamics, work and heat, state functions : internal energy and enthalpy, energy conservation, thermochemistry: heat of reaction, bond energies.
- Second law of thermodynamics, state function: entropy, Carnot cycle, entropy of pure substances and mixtures, third law of thermodynamics, chemical potentials.
- Chemical equilibrium, equilibrium constants, LeChatelier principle, change of states: phase diagrams, Clapeyron equation, colligative properties of solutions.
- Chemical kinetics, rate of reaction, rate coefficient, activation energy, reaction order.
- Ionic equilibrium, acids and bases (strong and weak), buffer solutions, dissociation constants, degree of dissociation, pH, titrations, solubility of electrolytes, solubility product.
- Electrochemistry, electrolysis and electrochemical cell, Nernst equation, Faraday Law.

### Content and teaching methods

Contents of the course are referred in the "cahiers des charges"

The course consists of theoretical lectures, exercises illustrating the oral presentation with actual examples, and three laboratory sessions on thermochemistry, chemical equilibrium and chemical kinetics, respectively.

### Other credits in programs

<b>PHYS12</b>	Deuxième candidature en sciences physiques	(4 credits)	Mandatory
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