

## Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
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ING127	Chemistry	1	2	0	2	3	4
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Prerequisites

Admission Requirements

Language of Instruction French

Course Type Compulsory

Course Level Bachelor Degree

This course aims to provide students with the fundamental knowledge (aqueous solutions, chemical thermodynamics) necessary to understand the operation of industrial chemical reactors used to manufacture basic products in various industrial sectors.

In this context, the objectives of this course are as follows:

Objective

- To provide students with basic knowledge of aqueous solutions (pH, redox reactions, complexation, and precipitation)
- To use the fundamental principles of chemical thermodynamics to understand, both qualitatively and quantitatively, the study of chemical reactions and the concept of chemical equilibrium
- To establish a link with the physical thermodynamics course

1. Review of aqueous solutions (solvent-solute)
2. Concepts of acids/bases (according to Brønsted) - Acid-base pairs
3. Reactions between acids and bases - pH calculation
4. Complexation reactions: precipitation
5. Redox reactions: definitions
6. Redox reactions
7. Application to the operation of electrochemical cells
8. Midterm exam week

Content

9. Introduction to chemical thermodynamics
10. First Law of Thermodynamics
11. Second Law and evolution of a chemical system
12. Chemical equilibrium: theoretical approach
13. Chemical equilibrium: applications
14. Laws of chemical equilibrium shifts (Lavoisier)

References

1. Atkins, P.W., "Chimie Physique – Vuibert", 2 vol., 1274 p. U-
2. Atkins P.W., "Éléments de chimie physique", De Boeck, 1998.
3. Course Notes

## Theory Topics

Week

Weekly Contents

- |    |   |
|----|---|
| 1  | A reminder about aqueous solutions                    |
| 2  | Acids and Bases: Definitions                          |
| 3  | Reactions between acids and bases - pH calculation    |
| 4  | Complexation reactions: precipitation                 |
| 5  | Redox reactions: definitions                          |
| 6  | Redox reactions                                       |
| 7  | Application to the operation of electrochemical cells |
| 8  | Midterm   |
| 9  | Introduction to Chemical Thermodynamics               |
| 10 | First Law of Chemical Thermodynamics                  |
| 11 | Second Law and evolution of a chemical system         |
| 12 | Chemical equilibrium: a theoretical approach          |
| 13 | Chemical equilibrium: applications                    |
| 14 | Laws of chemical equilibrium shifts (Lavoisier)       |