

Course Unit	General and Inorganic Chemistry		Field of study	Chemistry	
Bachelor in	Pharmacy		School	School of Health	
Academic Year	2022/2023	Year of study	1	Level	1-1
Type	Semestral	Semester	1	Code	9549-644-1105-00-22
Workload (hours)	135	Contact hours	T -	TP 22,5	PL 30
			TC -	S -	E -
			OT 7,5	O -	

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Miguel José Rodrigues Vilas Boas, Soraia Isabel Domingues Marcos Falcao

### Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. To describe the properties of matter in terms of its internal structure, its arrangement and the interrelationship between the parties.
2. To apply the general concepts of chemistry in the field of Health Sciences.
3. To perform calculations required for the experimental preparations.
4. To know the rules of safety in the laboratory.
5. To acquire techniques for handling the laboratory material.
6. To assemble simple laboratory experiments.

### Prerequisites

Before the course unit the learner is expected to be able to:  
There are no mandatory requirements.

### Course contents

Basic concepts in chemistry. Stoichiometry. Mixtures. Chemical kinetics. Chemical equilibrium. Heterogeneous equilibrium. Acid-base equilibrium. Complexion equilibrium. Oxidation-reduction reactions. Electrochemical.

### Course contents (extended version)

1. Basic concepts in chemistry:
  - Electronic structure of atoms.
  - Periodicity in the periodic table.
  - Structure of molecules.
2. Stoichiometry:
  - Stoichiometric calculations.
  - Limitant and in excess reagents.
  - Chemical reaction yield.
  - Empirical formulas and molecular formulas.
3. Mixtures:
  - States of matter and intermolecular forces.
  - Heterogeneous mixtures.
  - Homogeneous mixtures: Solutions, colloidal dispersions and suspensions.
  - Aqueous solutions and colligative properties of solutions.
  - Properties of gases.
4. Chemical kinetics:
  - Average, instantaneous and initial velocity of a reaction.
  - Kinetic law and rate constant.
  - Reaction orders.
  - Determination of rate reaction.
  - Factors influencing the rate of a reaction.
  - Theory of collisions.
  - Mechanisms of reactions.
  - Catalysis.
5. Chemical equilibrium:
  - Reversible reactions.
  - Equilibrium law for a reaction.
  - Constants of equilibrium.
  - Le Chatelier's principle and chemical equilibrium.
  - Equilibrium calculations.
6. Heterogeneous equilibrium:
  - Solubility and chemical equilibrium.
  - Solubility curves.
  - Solubility product.
  - Effect of ion common.
  - Precipitation reactions.
  - Coefficient of reaction.
7. Acid-base equilibrium:
  - Concept of Bronsted acid-base.
  - Ionic product of water.
  - Concept of pH.
  - Constants of ionization of acids and bases.
  - Buffer solutions.
  - Polyprotic acids.
  - Acid-base titration.
8. Equilibrium of complexation:
  - Complex and ligands.
  - Equilibrium of complexation.
  - Effect of complexation in solubility.
9. Reactions oxidation-reduction:
  - Half-reactions of oxidation and reduction.
  - Oxidation numbers.
  - Balance redox equations in acid and basic medium.
  - Redox titrations.
10. Electrochemical:
  - Spontaneous reactions.
  - Galvanic batteries.

**Course contents (extended version)**

- Schematic diagram-representation.
- Reduction potentials.
- Electromotive force.

**Recommended reading**

1. Chang, R. (2007) Química, Editorial McGraw Hill
2. Murray, J. e Fay, R. (2003) Chemistry, Prentice Hall
3. Goldberg, D. (2006) Fundamentals of Chemistry, McGraw-Hill
4. Ebbing, D. , Gammon, S. D. (2009) General Chemistry, Brooks Cole
5. Chang, R. , Overby, J. S (2011) General Chemistry: The Essential Concepts, McGraw-Hill

**Teaching and learning methods**

Lectures for acquisition of general concepts of chemistry. Practical and practical-theoretical classes for practice of: solving chemical problems and for application of theoretical concepts. Implementation of practical laboratory experimental and training with measurement laboratory materials.

**Assessment methods**

1. General assessment. - (Regular, Student Worker) (Final)
  - Final Written Exam - 70% (The theoretical component will be held by exam (partial exam or full exam).)
  - Practical Work - 30% (The practical component will be:
    - Performance (6%);
    - Quiz (6%)
    - Practical assays (6%))
2. Global Assessment - (Student Worker) (Final, Supplementary, Special)
  - Final Written Exam - 100% (Theoretical and practical components evaluated in simultaneous.)
3. Global Assessment - (Regular) (Supplementary, Special)
  - Final Written Exam - 100% (Theoretical and practical components evaluated in simultaneous.)

**Language of instruction**

Portuguese, with additional English support for foreign students.

**Electronic validation**

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22-11-2022	24-11-2022	30-11-2022	02-12-2022