Course Unit	Fundamentals of Physical and Chemistry	Field of study	Training in Teaching Area
Bachelor in	Basic Education	School	School of Education
Academic Year	2023/2024	Year of study	1
Level	1-1	ECTS credits	5.0
Type	Semestral	Semester	2
Code	9853-531-1203-00-23		

Workload (hours)	135	Contact hours	T -	TP 27	PL 18	TC -	S -	E -	OT 9	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)	Adorinda Maria Rodrigues Pereira S. Gonçalves

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. To know basic concepts about the properties, the structure and the transformations of the materials;
2. Distinguish different types of structures based on their materials properties;
3. Show ability to use of basic laboratory techniques and develop research activities including laboratory work to resolve problem situations;
4. Interpret situations based on theories about the constitution, properties and transformations of materials;
5. Explain the importance of energy and discuss the necessity of balanced energy resource management considering the impact of their use on the environment;
6. Know basic concepts and principles of hydrostatic and explain concrete situations of floating / sinking of bodies and fluid flow;
7. Explain the influence of man in the evolution of atmosphere and Earth's climate;
8. Show ability to collect, select and interpret relevant information, for the interpretation of situations and personal opinion on ambiental problems.

Prerequisites

Before the course unit the learner is expected to be able to:
Prerequisites are not required.

Course contents

1 Properties of materials and its structure; 2 The air and water - importance and properties; 3 Sources, transfers and transformations of energy; 4 Some chemical compounds and their reactions; 5. Hydrostatic and hydrodynamics - basic principles.

Course contents (extended version)

1. Properties of materials and its structure
   - Theory corpuscular and physical properties of materials
   - Solids, liquids and gases - physical state changes
   - Energy accumulated and temperature - the conservation of energy in physical systems
   - Heat transfer - conduction and heat capacity
   - Electrical circuits - conductors
   - Chemical properties of materials - chemical reactions and its representation.
2. The air and water - importance and properties
   - The atmosphere: composition and air quality
   - Properties of air: atmospheric pressure
   - Water quality
   - Evolution of atomic models and chemical bonds: the structure of water
   - Other molecular crystals
   - Structures giants: ionic, metallic and covalent bonds
   - The carbon and their compounds
3. Sources, transfers and transformations of energy
   - Energy and chemical reactions: endoenergéticas and exoenergéticas reactions
   - Energy light - luminous phenomena: scattering and reflection of light
   - Refraction of light - optical instruments
   - Energy transformations in electric circuits
   - Energy transfer through forces
   - radioactivity - radioactive isotopes; decay and nuclear fission.
4. Some chemical compounds and their reactions
   - Concepts of acid, base and salt; indicators
   - Strengths of acids and bases and the pH scale
   - Acid-base reactions
5. Hydrostatic - basic principles
   - Pressure forces and pressure inside a fluid
   - Fundamental law of hydrostatic
   - Floating and sinking of bodies

Recommended reading

1. Chang, R. (2010). Química geral - Conceitos essenciais. Editora McGraw-Hill de Portugal, Lda.
2. Costa, M. M. R. , & Almeida, M. J. M. (2012). Fundamentos de física. Edições Almedina.
3. Escoval, M. T. (2010). A Acção da química na nossa vida. Editorial Presença.
4. Graner, F. (2010). Problemas de física da vida quotidiana. Instituto Superior Técnico.
5. Silva, J. , & Silva, J. (2011). Os elementos químicos e a vida. Instituto Superior Técnico.

Teaching and learning methods

Theoretical and practical sessions taken from situations encountered by students in activities or practices in their daily life. Discussion of proposed topics, including laboratory work in small groups. Use of diverse material resources, accessible to future teachers in the classroom.

Assessment methods

1. Continuous evaluation - (Regular, Student Worker) (Final)
   - Intermediate Written Test - 70%
   - Laboratory Work - 30% (Practical work (reports and observation grid))
2. Final exam - (Regular, Student Worker) (Supplementary, Special)

Assessment methods

- Final Written Exam - 70% (written test)
- Practical Work - 30% (Practical work (Reports and observation grid))

Language of instruction

Portuguese

Electronic validation

Adorinda Maria Rodrigues Pereira S. Gonçalves	Paulo Miguel Mafra Gonçalves	Maria Cristina do Espírito Santo Martins	Carlos Manuel Costa Teixeira
14-02-2024	14-02-2024	14-02-2024	18-02-2024