Laboratory I

Calendar: 1st day semester

Contact Hours: PL 45,0h; OT 15,0h

Scientific Area: Chemistry

Intended learning outcomes (knowledge, skills and competences to be developed by the students):

Goals: Know the safety rules of a chemistry laboratory; Learn how to properly use laboratory equipment used in most common chemistry laboratory operations. Learn the basics of statistical analysis of results; know how to do calculations for the preparation and standardization of solutions. Apply basic concepts of chemical reactions, write and balance chemical equations. Know how to perform stoichiometric calculations. Learn the correct procedures for recording and reporting experimental results. Develop skills for the interpretation of experimental results based on the interconnection of laws and scientific theories.

Plan an experiment to answer a question-problem. Improve teamwork through processes of negotiation, conciliation and joint action with a view to present a final product.

Syllabus:

1 - Safety in a Chemistry Laboratory. Signs

2 - Errors and Error Treatment

3 - Units of concentrations and stoichiometric calculations

4 - Errors associated with the glassware – experimental determination

5 - Chemistry Laboratory unit operations: measurement of mass, of volume and preparation of solutions

6 - Titrations

7 - Solid-liquid processes (filtration) and liquid-liquid processes (extractions).

8 - Techniques for purifying compounds (crystallization, distillation, chromatography, etc.).

Evidence of the syllabus coherence with the curricular unit's intended learning outcomes:

The main goal of this curricular unit is to introduce the chemistry Laboratory and the most common laboratorial operations to the students. Thus, its syllabus includes the safety rules in a chemistry lab, stoichiometric calculations, the evaluation of experimental errors, the most common unit operations in a chemistry lab, titrations, and purification methods.

Team work and development of communication skills are also goals of this curricular unit. Syllabus was defined to directly follow the curricular unit's objectives.

References:

1. Chang, Raymond. Química. 5ª edição, McGraw-Hill, 2000.

2. Skoog; Weest; Holler, Fundamentals of Analytical Chemistry, 6ª edição, Saunders College Publishing, 1992.

3. Pombeiro, Armando J.L. Técnicas e operações Unitárias em Química Laboratorial, Fundação Calouste Gulbenkian, 1990.