

Laboratory I

Calendar: 1st semester

Contact Hours: 45h00 PL + 15h OT

Scientific Area: Química

Learning outcomes of the curricular unit

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).

Demonstration of the syllabus coherence with the curricular unit's objectives

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.

Teaching methodologies (including evaluation):

Laboratory classes are performed according to the syllabus. Each practical work is preceded by a discussion of the scientific principles and procedures underlying the protocol of each laboratory experimental work. Before laboratory classes, students prepare their work by making the required annotations on the theoretical principles, experimental procedure and calculations in their lab notebook, which is required to bring to all classes. In the week following the completion of the laboratory work, students present their results, calculations and updated discussion in the laboratory notebook, as well as a complete report.

Evaluation during the semester:

- 15 % - Assessment of individual performance + laboratory notebook by direct observation
- 40 % - Reports (Group)
- 20 % - Discussion of reports (Group)
- 25 % - Laboratory Examination (individual)

Demonstration of the coherence between the teaching methodologies and the learning outcomes.

The Laboratory sessions enable students to become familiar with experimental techniques commonly used in chemistry, including the use of instruments, observation of phenomena and achieving results. In addition, the student must learn to process data and understand the degree of precision and accuracy in measurements in a given analysis and estimation of errors. This period of methodology acknowledgement and analysis of scientific

results allows to build up basic skills for an experimental course, such as Chemical Engineering, allowing students an overview of the entire course.