

# Laboratory II

**Calendar:** 2nd semester

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

## **Intended learning outcomes of the curricular unit:**

A set of objectives for each laboratory session has been included in the Laboratory Manual. The purpose of these objectives is to guide the student in understanding of each method and to help the student to prepare for each laboratory session. After completed the course, students should have acquired the following competencies: Proficiency at handling chemicals and using laboratory equipment; Understanding of the practice of classic titration; Writing skills using scientific prose.

## **Syllabus:**

1. Fundamentals of Analytical Chemistry and laboratory. 2. Acid-Base Titration. 3. Potentiometric titration. 4. Precipitation Titration. 5. Complexometric titration. 6. Organic chemistry: identification of functional groups through chemical reactions. 7. Organic chemistry: nucleophilic substitution SN1. 8. Organic chemistry: condensation polymerization and addition polymerization.

## **Demonstration of the syllabus coherence with the curricular unit's intended learning outcomes.**

The practical instruction (represented here by laboratory sessions) has a double objective: to strengthen knowledge obtained in the lecture portion and confront the student with experimental techniques related with organic chemistry and analytical chemistry.

The laboratory sessions have been designed with the objective that the student correlates many of the concepts studied in lecture, convincing him or her in this way that the knowledge obtained throughout the course can be applied to optimize processes and chemical transformations, whose transcendence goes beyond mere academic interest.

## **Teaching methodologies (including evaluation):**

The modular course consists of two preliminary lectures and eight experiments performed by teams of two students each. The lab work is organized as follows: 1- Preparing for the experiment. The students should read and understand the laboratory protocol and read suggested reference materials prior to the lab session. In addition, some lab session time will usually be devoted to a discussion of the theory concern the experiment. 2- Running the experiment. Each team is responsible for conducting each experiment under supervision of instructor. 3- End of the experiment. Preliminary discussion of the experimental outcomes with instructor. 4- Report. The final grade will be determined by proportionally weighting performance in the following assessment elements: full reports (3 x 10 %) and technical reports and quizzes ( 5 x 10%); Individual practical examination (10% ); participation in lab work as evaluated by instructor (10 % ).

## **Demonstration of the teaching methodologies coherence with the curricular unit's intended learning outcomes.**

Laboratory sessions enable students to become familiar with experimental techniques often used in analytical chemistry and organic chemistry, including the use of instruments, observation of phenomena and achieving results. In addition, the student must learn to process the data and understand the degree of precision and accuracy in measurements made by the analysis and estimation of errors.

This period of learning the methodology and analysis of scientific results is one of the most important skills for an experimental course, such as Biotechnology, allowing students an overview of the entire course