

Laboratory IVB

Calendar: 4th semester

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

Intended learning outcomes of the curricular unit:

This curricular unit is based on laboratories experiences representing theoretical concepts acquired in Separation Process IB, Transport Phenomena II, Cellular and Molecular Biology, Biological Reactor IB curricular units.

It is intended that, in this curricular unit, the students acquire the following competencies: Plan, implement, develop and optimize experiments in the area of the curricular units that the laboratory work refers; - Interpreting results of experiments that highlight some of the basic phenomena I transfer, materials and biochemistry; Correlate the theoretical models taught, with the proper applicability in treatment of experimental results; Handle material / specific equipment used in carrying out the experiments.

Syllabus:

Laboratory IVB consists in a set of laboratory sessions involving the application of knowledge acquired in, Process Separation IB, Transport Phenomena II, Cellular and Molecular Biology.

1. Determination of transfer coefficients and mass transfer rate in Gas-Liquid. 2. Determination of transfer coefficients and mass transfer rate in Liquid-Liquid. 3. Sieve analysis. 4. Determination of the terminal settling velocity in two different fluids. 5. Determination of the specific resistance of the medium filter; 6. Fractionation and isolation of cellular components from spinach leaf cells by differential centrifugation. 7. Isolation of nucleic acids: RNA and DNA by chloroform extraction at acid and basic pH. Analysis by agarose gel and UV spectrophotometry.

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

In Laboratory IVB the student will consolidate the theoretical knowledge and theoretical-practical knowledge acquired in the several curricular units lectured during the semester. . Taking in consideration the theoretical concepts acquired in these curricular units, an homogeneous distribution of several laboratory experiences and reports related with microbiology, separation processes IB, Phenomena II, Biological Reactors is performed. By performing these laboratory experiments, student's acquire planning, implementation, development and optimization experience knowledge in the area of referred curricular units that relate laboratory experience. Also correlation skills between the theoretical models taught on the curricular unit classes and its proper applicability to the experimental results obtained.

Teaching methodologies (including evaluation):

Execution of laboratory experiences related to several curricular unit programs. Each experimental work is preceded by a discussion of scientific principles and procedures of the work protocol. The students should prepare of laboratory work by place the necessary theoretical support, experimental procedure and calculations on the individual lab notebook, (mandatory). In the following week, students should have the results, calculations and data discussion in the lab notebook. This information must be available for evaluation by the teacher when requested.

The evaluation has the following components: questionnaire at the beginning of each laboratory session; student's performance in carrying out laboratory work; sheets results and laboratory notebook; report preparation and its discussion/presentation. The final rating will be the weighted average grade obtained in each laboratory work. To pass is required, a minimum score of 9,5 values (0 to 20 values scale).

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

Laboratory IVB a curricular unit which intended to consolidate the theoretical knowledge knowledge acquired in several curricular units of the semester in which it is taught. Several laboratory experiences are carried out and results treatment is presented in a technical

report. With evaluation of questionnaires conducted at the beginning of each class, permits the student to prepare itself for laboratory class, having a prior knowledge of the work to be done, as well as the theoretical principles behind such laboratory experience. The student's performance at the laboratory, laboratory results report and laboratory notebook will also be evaluated, preparing the student for working life, giving him experience of working a laboratory context. With a report and its discussion / presentation allows the teacher to evaluate its understanding of the theoretical principles of the referred experience as well as the ability to apply the theoretical concepts acquired during the theoretical classes of the several curricular units.