Universitat Autònoma de Barcelona

2017/2018

Integrated Laboratory Class 2

Code: 100885
ECTS Credits: 3

Degree	Type	Year	Semester
2500252 Biochemistry	OB	1	2

Contact

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Use of languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: Yes

Teachers

Ignasi Roig Navarro

Prerequisites

The student must attend simultaneously or have taken the theory subjects, which are taught during the same semester, corresponding to the contents of the practices of this subject,

In order to attend the laboratory classes it is necessary for the student to justify having passed the biosecurity and security tests that you will find in the Virtual Campus and be knowledgeable and accept the operating rules of the Bioscience Laboratories.

The test is answered in the corresponding space of the Virtual Campus and the information that must be consulted is in the communication space of the Degree in Biochemistry.

It is advisable for students to review the theoretical contents on which this subject is based

Objectives and Contextualisation

The subject of Integrated Laboratory 2 is part of a set of six subjects that are distributed throughout the first six semesters of the Degree in Biochemistry.

The educational objective of these subjects is the acquisition of practical skills of the student.

The contents are organized in a growing order of complexity, associated to the needs and to the acquisition of the theoretical contents.

During the Integrated Laboratory II the student acquires practical skills in the contents:

- Thermodynamics and Kinetic

- Histology

- Microbiology

- Organic Chemistry of Biochemical Processes

- Biochemistry I.

The practices in the laboratory focus on the learning of basic techniques specific to each field and on the characteristics of work in the laboratory.

Biochemistry module I

-To be able to choose and prepare the appropriate pH buffering system.

-To be capable of performing a heterologous protein production process, identifying the different stages of the process, and the parameters to be controlled.

-To be able to use hydrophobic chromatography in protein purification.

-To be able to perform amplifications of specific fragments of nucleic acid with the polymerase chain reaction (PCR) technique, knowing the parameters that are critical in the design of the encephalon, and in the realization of the reaction of the PCR.

-To be able to perform electrophoresis in agarose gels as a common tool in the separation and identification of nucleic acid fragments.

Organic Chemistry Module of Biochemical Processes

Objectives: Domain of experimental reflux techniques, acid vapor trap, extraction, distillation at atmospheric pressure and determination of purity according to the boiling point.

Module Histology

To know how to apply basic histological techniques for microscopic diagnosis.

To Identify to the microscope various animal tissues and their cellular and extracellular components.

Module Microbiology

- Understand and know how to apply basic laboratory techniques to work experimentally with microorganisms.

- Know how to perform basic calculations to determine microbiological parameters.

- Evaluate the presence of microorganisms, their diversity and their ability to spread in all types of environments.

Content

The subject is structured in:

Histology module

Practice 1: Initiation to histological techniques for the processing of animal material. Microscopic identification of the epithelial, connective and adipose tissues.

Practice 2: Elaboration and staining of smear of blood of sheep. Microscopic identification of the blood and cartilage and bone tissues.

Practice 3: Microscopic identification of the muscular and nervous tissues

Biochemistry module

Practical sessions of 4 hours each

Practice 1 :. Expression and purification heterologous proteins (this practice covers three sessions): transformation with the expression vector. Preparation of buffer solutions

Practice 2: Expression and purification of heterologous proteins: inoculum of transformants in the culture medium. Amplification of a gene by the polymerase chain reaction (PCR): PCR reaction.

Practice 3: Expression and purification of heterologous proteins: lysis and purification by hydrophobic chromatography. Amplification of a gene through the polymerase chain reaction (PCR): analysis by agarose gel electrophoresis

Thermodynamics and Kinetics

Contents

1. Thermodynamics Practices:

1st. Use of the calorimeter to study phase change processes. Determine the calorific capacity of the calorimeter, using the method of mixes, since it is a data that we need to know to complete this practice and the following. Determine the latent heat of gel melting.

1b. Determination of reaction calories. Determine the reaction heat (reaction enthalpy) of different chemical processes (acid / base) in dissolution by using a constant pressure calorimeter.
Analyze the factors that depend on the measured dentiation changes.

2. Kinetics Practice:

Kinetics of the hydrolysis reaction of an ester in a basic environment.

Determine the velocity constant k for thehydrolysis reaction of acetylsalicylic acid in commercial tablet at room temperature.
Determine the speed constant k for hydrolysis reaction of acetylsalicylic acid in commercial tablet at 40 ° C.
Determine the energy of the experimental activation Eade the same reaction, through the values of k obtained at different temperatures.

Organic Chemistry Module of Biochemical Processes

Contents

PRACTICE 1.-Reduction of an alcohol ketone: obtaining benzhydrol from benzophenone.

Objectives: Domain of the experimental techniques of crystallization, recrystallization, filtration by suction, determination of the melting point and thin-layer chromatography.

PRACTICE 2.-Substitution reaction of the hydroxyl group by a halogen: preparation of n-butyl bromide from n-butanol.

Objectives: Domain of experimental reflux techniques, acid vapor trap, extraction, distillation at atmospheric pressure and determination of purity according to the boiling point.

Microbiology module

Daily practical sessions of 3 hours each

Practice 1. Isolation, observation, characterization and identification of microorganisms

Practice 2. Methods of counting microorganisms

Practice 3. Ubiquity and microbial diversity

Practice 4. Kinetic growth of a microorganism