Universitat Autònoma de Barcelona

2020/2021

Integrated Laboratory Class 2

Code: 100927
ECTS Credits: 3

Degree	Type	Year	Semester
2500253 Biotechnology	OB	1	2

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

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: No

Prerequisites

You must be attending simultaneously or have taken the theory subjects corresponding to the contents of the laboratory practices.

You must have passed the safety test in laboratories. The test is answered in the corresponding space of the Virtual Campus and the information that must be consulted is in the space of communication of the Degree in Biotechnology.

Objectives and Contextualisation

The Integrated Laboratory 2 is the second subject of a group of 6 that are distributed over the 6 semesters corresponding to the first three years of the Degree in Biotechnology.

The training objectives of these subjects focus on the acquisition of competences within the framework of the practical training of the student.

The Integrated Laboratory 2 has as its training objectives the acquisition of practical skills in 4 specific contents:

- Organic Chemistry.

- Genetics.

- Animal and Plant Biology.

- Plant Physiology.

The specific objectives of each of the parts of the subject are the following:

Organic Chemistry: With the first two practices, the student is expected to acquire techniques such as the manipulation of an pH meter and the assessments. With the remaining four practices it is intended that students know the basic techniques of work in an organic chemistry laboratory, as well as reflux, distillation,

filtration, extraction and some techniques to determine the purity of the obtained products (melting and boiling points , Chromatography in thin layer). You will also learn to search for information in books such as the Handbook of Chemistry and the Merck Index.

During the realization of the practices the students will have to apply the knowledge assimilated to the subject of organic chemistry related to the reactivity of the organic molecules.

Genetics: Recognize the morphology of Drosophila and learn about the life cycle and cytogenetics of this organism in order to manipulate it at the genetic level. Experimenting the concepts of Mendelian genetics (principles of segregation, genes and alleles, relationship of dominance, type of inheritance, concepts of genotype and phenotype, recombination) in the development of a genetic map of three markers, using Drosophila As a model. Use different cytogenetic techniques for the preparation and observation of chromosomes. Identifynormal karyotypes and mutant kariotypes, and learn how to relate them to a certain phenotype. Apply computer tools for the estimation and interpretation of the genetic variation of blood groups in human populations.

Animal and Plant Biology: Correct use of optical material for the observation of fauna and flora (binocular magnifying glass, microscope). Recognize the anatomical and morphological characteristics of the different animal groups. Identify and locate taxonomically the observed animal species.

Learn to recognize fungi, algae, cyanobacteria, aquatic photosynthetic eukaryotes and significant plants in the world of biotechnology through its morphological characteristics.

Plant Physiology: Describe the molecular, cellular and physiological bases of the organization, functioning and integration of living organisms within the framework of their application to biotechnological processes.

Competences

- Describe the molecular, cellular and physiological bases of the organisation, functioning and integration of living organisms in the framework of their application to biotechnological processes.
- Lead and manage teams, and develop capacities for organisation and planning
- Learn new knowledge and techniques autonomously.
- Make decisions.
- Think in an integrated manner and approach problems from different perspectives.
- Use the fundamental principles of mathematics, physics and chemistry to understand, develop and evaluate a biotechnological process.
- Work individually and in teams

Learning Outcomes

1. Apply the methods for observing chromosomes and Barr corpuscles in human cells.
2. Assign mutants to chromosomes.
3. Draw up genetic maps.
4. Lead and manage teams, and develop capacities for organisation and planning
5. Learn new knowledge and techniques autonomously.
6. Locate, recognise and identify animal and plant organisms plants of interest in biotechnology.
7. Make decisions.
8. Recognise the different phases of mitosis and meiosis.
9. Recognise the functioning of physiological processes in plants, with a view to using them in biotechnology.
10. Think in an integrated manner and approach problems from different perspectives.
11. Use the basic techniques for studying biomolecules in a chemistry laboratory.
12. Work individually and in teams

Content

Organic chemistry:

Measurement of the pH, relative strength of acids and bases: use of pHmeter and preparation of buffer solutions.

Determination of the molecular mass of an acid: evaluate a dissolution with an indicator

Reduction of one ketone in alcohol: obtaining benzhydrol from benzophenone. Applied techniques: crystallization, suction filtration, determination of the melting point, thin layer chromatography

Sterilification of an alcohol: preparation of isoamyl acetate from isoxylic alcohol. Applied techniques: reflux, extraction, distillation at atmospheric pressure and determination of the purity according to the boiling point

Genetics:

Introduction to the biology and morphology of *Drosophila*. Preparation of a three-marker genetic map. Observation of chromosomes and mutations Genetic variability of blood groups in human populations.

Animal Biology:

Protestoms ecdisozous. Nemathodes. Basic characters Adaptations to different types of life. Biological cycles but representative. Biotechnological use of entomopathogenic nematodes.

Hexapods (Insects). Main groups Insects and man.

Deuterostoms. Echinoderms. General organization of the group and adaptive diversification.

Plant Biology:

Fungi: Basic characters, morphology and structures. Modifications and biotechnological use.

Cyanobacteria and aquatic photosynthetic eukaryotes. Basic characters, morphology and structures. Modifications and biotechnological exploitation.

Viridiplantae. Basic characters, morphology and structures. Modifications and biotechnological exploitation.

Plant Physiology:

Determination of the Hydric Potential in plant tissues,

Determination of the physiological effects of a plant hormone (Citokinins)

Study of photosynthesis by Hill's reaction.

Measurement of water relations: Incipient plasmolysis method.

*Unless the requirements enforced by the health authorities demand a prioritization or reduction of these contents.

Methodology

In general, all the activity in the laboratory is at the same time guided, when the teacher imparts the relevant explanations and supervised when the students carry out their work aunomously.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Animal Biology	6	0.24	5, 2, 4, 8, 10, 7, 12

Genetics	12	0.48	5, 9, 3, 1, 4, 10, 7, 12
Organic Chemistry	18	0.72	5, 4, 10, 7, 12, 11
Plant Biology	6	0.24	5, 2, 4, 8, 10, 7, 12, 11
Plant Physiology	12	0.48	5, 2, 4, 10, 7, 6, 12
Type: Autonomous			
Autonomous work	14	0.56	5, 12

Assessment

Since this is a practical subject, according to article 112 ter. of the modification of the Academic Regulation RD 1293/2007, this subject does not contemplate systems of recovery.

Organic chemistry: The assessment will consist of a part of continuous evaluation (work in the laboratory, laboratory book, questions to be answered) as well as a final exam that could be scheduled the same day as the afternoon practices end, or the Next week The continuous evaluation will have a weight of 40%, and 60% the mark of the practice exam.

Genetics: Each of the practices will be evaluated with a written test of 5 single answer questions with three options to choose from. In the end, the notes of the four laboratories will be counted and a single note will be taken.

Animal Biology: At the end of each practice the student will have to answer a questionnaire to evaluate that he has obtained the knowledge and the specific competences of each practice

Plant Biology: An examination will be made up of two parts: Visum and Description of a fruit / fruit or modification of the corm where the achievement of the basic objectives of the module will be evaluated.

Plant Physiology: Assistance, attitude and elaboration of the practice report will be valued. At the end of each practice the student will have to answer a questionnaire that will have to be delivered to the teacher for evaluation.

Overall course grade: It will be possible to compensate between modules if any of them is suspended with a note greater than 4.5 and if the calculation of the weighted average is superior to 5, understanding that the student has had to submit to 100% of the evaluation tests. In the event that a module does not reach this minimum mark of possible compensation or the student has not been presented to any of the parties, the subject will be suspended with a 4, regardless of whether the calculation exceeds 5. In If the weighted note is less than 4, the overall mark will be the result of the calculation obtained. In the event that the subject is suspended, the marks over 5 of the surpassed parts will remain in the face of the next course, so that the student does not have to be presented again to these parts, although if they do You request, you have the right to submit again and in this case you will lose the previously obtained note.

It is understood that when talking about modules it refers to the global part and not to the internal subdivisions that these modules may have, because in them the criterion that the responsible professor thinks will be applied.

Not evaluable: Attendance at practical sessions (or field trips) is mandatory. The students will obtain the "Non-Appraising" qualification when the absence exceeds 20% of the programmed sessions. Therefore, in each module the student will be described as Non-Valuable, that without justified and documented cause does not attend this minimum of hours of programmed practical sessions and will be automatically fail with a note of 4,0 regardless of the global mark that they may obtain from the weighted calculation.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Animal Biology	6/54	1	0.04	5, 2, 4, 8, 10, 7, 12
Genetics	12/54	2	0.08	5, 9, 3, 1, 4, 10, 7, 12
Organic Chemistry	18/54	2	0.08	5, 4, 10, 7, 12, 11
Plant Biology	6/54	1	0.04	5, 2, 4, 8, 10, 7, 12
Plant Physiology	12/54	1	0.04	2, 4, 10, 7, 6, 12

Bibliography

Consult Virtual Campus for each module.