

**Integrated Laboratory Class 6**

Code: 100923  
ECTS Credits: 3

Degree	Type	Year	Semester
2500253 Biotechnology	OB	3	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: No  
Some groups entirely in Spanish: No

**Teachers**

Maria Margarita Julia Sape  
Escarlata Rodriguez Carmona  
Maria Carme Espunya Prat  
Carme Roura Mir

**Prerequisites**

443/5000

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

Bioinformatics

Immunology

Advanced Experimental Techniques

Virology

To be able to attend it, it is necessary for the student to justify having passed the biosafety and security tests that he will find in the Virtual Campus and be knowledgeable and accept the operating regulations of the laboratories of the Faculty of Biosciences.

**Objectives and Contextualisation**

The Integrated Laboratory 6 is the last 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 contents are organized in a growing order of complexity and associated to the needs and progress of the theoretical contents of the Degree.

The Integrated Laboratory 6 has as its training objectives the acquisition of practical skills in 4 specific contents:

- Bioinformatics
- Immunology
- Advanced Instrumental Techniques
- Virology

## **Content**

The subject is structured in 4 types of contents:

### Bioinformatics

3 sessions of 4 hours, in principle, in the computer room.

The student will carry out a miniproject that will consist of discovering a new gene, and characterizing it, using bioinformatics tools. As a "new gene", we understand one that has not been previously annotated.

The student will have to put into practice the knowledge acquired in the subject of Bioinformatics, for example: study of the characteristics of the starting protein, database searches, and advanced BLAST searches, multi-alignments and phylogenetic trees, prediction of Three-dimensional structure, study of domains, comparison and structural classification

### Immunology

3 sessions of 4 hours that are done in the laboratory.

Session 1: Study of the ability of phagocytosis of the cells of the immune system. Analysis by flow cytometry. Precipitation and agglutination of serum immunoglobulins.

Session 2: Quantification of human immunoglobulins through Elisa.

Session 3: Separation of lymphocytes with a density gradient. Proliferation of T. lymphocytes

### Advanced Instrumental Techniques

Practice 1: Subcellular fractionation (two continuous sessions)

Session 1: Homogenization of tissue / differential centrifuges / Quantification of protein

Session 2: Enzymatic activities LDH, GDH

Practice 2: Applications of spectroscopy and spectrofluorimetry

Session 3:

Titration of tyrosine of a protein

Study of the interaction of DNA with the bromide of ethid by means of spectrofluorimetry.

Quantitative PCR: theoretical and practical foundation, analysis of results, obtaining a fusion curve and calculation of the amplicon  $T_m$ .

## Virology

4 sessions of 4 hours (in 4-day practices weeks) or 4 sessions of 3 hours plus a session of 4 hours (in the weeks of practices of 5 days) and a seminar of presentation and analysis of the results that are done at Laboratory

Obtaining a virus stock: infection and amplification.

Obtaining and quantification of viral lysates.

Neutralization of virus for antibodies.

Purification of viral genomes.

Identification of viruses by specific amplification of viral genes.

Observation of viruses by electronic transmission microscopy.

Detection of recombinant fluorescent proteins using the expression system Insulin cells Baculovirus by confocal microscopy.

Detection of viruses in wastewater.

For safety reasons, these practices are performed with bacteriophages, which can not infect or transduce mammalian cells, and noninfectious viral nucleic acids. All the material delivered to the students is therefore free of viruses that can infect or transduce mammals. In any case, basic handling techniques in a Virology laboratory are comparable to those used when working with bacterial viruses or eukaryotic viruses, and therefore the proposed objectives can be achieved perfectly.