

## Laboratory I

Code: 101907  
ECTS Credits: 6

**2025/2026**

Degree	Type	Year
Biomedical Sciences	OB	1

## Contact

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## Teachers

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## Teaching groups languages

You can view this information at the [end](#) of this document.

## Prerequisites

There are no official requirements, but it is advisable that students hold sufficient knowledge of the following areas.

- 1) Biology, mainly human.
- 2) Organic and inorganic chemistry.
- 3) The official languages of the UAB.

## Objectives and Contextualisation

The subject "Laboratori I" in the 1st course of the Degree develops the foundations of the more basic techniques in biomedical research. The subject is formed by eight independent areas or modules, being the ECTS allocated as follows:

- 1.- Bioquímica I (1 ECTS).
- 2.- Bioquímica II (1 ECTS)
- 3.- Genètica (1 ECTS).

- 4.- Biologia cel·lular (1 ECTS).
- 5.- Histologia (0.5 ECTS).
- 6.- Fisiologia (0.5 ECTS).
- 7.- Microbiologia i virologia (0.5 ECTS).
- 8.- Bibliografia biomèdica (0.5 ECTS).

This subject is followed in the 2nd course by the subject "Laboratori II", also allowing a better understanding of other subjects with a high experimental content, such as Pharmacology o Molecular Biology of the Cell.

Subject aims:

- 1) To identify the main basic experimental techniques used in every one of the aforementioned modules.
- 2) To apply the acquired knowledge in the planning and implementation of research projects, as well as in the development and innovation in a Clinical or Biomedical laboratory. To identify and to apply the correct study methodologies in the development of research projects. To plan and implement experiments and procedures of analyses in the biomedical field.
- 3) To demonstrate that the bases and the elements used in the development and validation of techniques of diagnoses and therapeutics are known. To identify and critically evaluate methodologies for the experimental study of diseases.
- 4) To correctly use the security protocols in the laboratory, as well as the residues management.
- 5) To be competent in the use of the basic information sources used in science: to correctly identify accredited information sources, to learn to correctly cite works and to evaluate the impact of the publication.

## Learning Outcomes

1. CM29 (Competence) Interpret experimental results in a real-world laboratory or company to prepare and defend academic or professional work in the field of biomedicine.
2. KM36 (Knowledge) Describe the main research techniques used in the biomedical sciences.
3. SM32 (Skill) Apply safety and waste management protocols in the biomedical laboratory.
4. SM33 (Skill) Apply bioinformatics resources for communication, searching for information and data processing in the field of biomedicine.

## Content

"Laboratori I" consists in Laboratory or classroom work applicable at any biomedical research issue which a future Graduate in Biomedical Sciences can found:

Biomedical Bibliography Module (0.5 ECTS):

- 1.- UAB libraries search engine.
- 2.- Information sources in Biomedicine.
- 3.- Bibliographic citations.
- 4.- Copyright.

**Biochemistry Module I (1 ECTS):**

1. Determination of glucose concentration by a colorimetric methods.
2. Preparation of buffer solutions.
3. Gel-filtration chromatography.
4. Process of Expression and Purification of a heterologous protein.
5. Determination of protein concentration by a colorimetric methods.
6. Separation of proteins by SDS-electrophoresis.

**Cell Biology Module (1 ECTS):**

- 1.- Introduction to the optical microscope.
- 2.- The plant cell.
- 3.- The animal cell.
- 4.- Introduction to the electron microscope.
- 5.- Osmosis and simple diffusion.
- 6.- Mitotic and meiotic cell division.
- 7.- Cellular fragmentation and organelle isolation.
- 8.- Basic cell culture techniques: counting and viability assays.

**Genetics Module (1ECTS):**

1. Observations in human chromosomes.
2. Observations of wing mutations in *D. melanogaster*.
- <span lang="EN-US">3. Determination of a genetic map.
4. Determination of genetic variability.

**Module Virology and Microbiology (0.5 ECTS):**

1. Techniques of sterilization.
2. Preparation of culture media.
3. Methods of microorganism counting.
4. Methods of conservation and isolation of microorganisms.
5. Observation of microorganisms. Staining and motility.
6. Identification of microorganisms.

**Histology Module (0.5 ECTS):**

Practice 1: To learn histological techniques from animal sources. Microscopic identification of epithelial, conjunctive, adipose, cartilaginous and bone tissue.

Practice 2: Obtaining and staining of blood smears. Microscopic identification of blood elements and of the nervous and muscular origin.

### Physiology Module (0.5 ECTS):

#### Practice 1: Nerve impulses in the peripheral nerves.

To learn instruments and techniques in the study of the conduction of impulses from peripheral nerves.

-Learn the meaning of the functional electrophysiological records in the sensory nerves.

-To observe variations in the speed of nerve conduction with body temperature.

-To check the existence of refractory periods in the production of the nerve impulses.

-To calculate and interpret the basic parameters of the electrophysiological recordings in the peripheral nervous system.

#### Practice 2: Neuromuscular Function.

-To get tension recordings of contractile skeletal muscle.

-To observe the summation of contractions with repeated stimulation.

To demonstrate the appearance of muscle fatigue with repeated contraction.

### Biochemistry Module II (1 ECTS):

1. Introduction to bioinformatic analysis of proteins and their ligands.

2. Introduction to Mass Spectrometry and Proteomics.

3. Visit to the Alba synchrotron: Introduction to the uses of synchrotron light in aspects related to the study of organic matter.

## Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
<hr/>			
Type: Directed			
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Laboratory classes	97	3.88	
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Type: Supervised			
Tutorship	4.5	0.18	
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Type: Autonomous			
Preparation of questionnaires, reports and panels.	25.5	1.02	
Study	15	0.6	
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The center of the learning process is the work of the student, structured basically in practical classes. The student learns to work, being the mission of the teacher to help him in this task by providing information or showing the sources where it can be achieved and directing his steps so that the learning process can be carried out effectively. If this is true for any subject, in a fully practical one as "Laboratory I" is not only valid, but the work of the student happens a basic need for the existence of the subject in real time.

At the beginning of each semester the student receives a dossier or script with the practical work that will have to develop in that semester. In general, students have to carry out the experimentation indicated in the script, following the initial instructions provided by the teachers. Once the results are obtained, the results will be shared, discussing both the point of view of the experimental base and the biological context of the results obtained. In this part, or in any other that is considered opportune, it will be possible to carry out small seminars on the technique of interest. The seminars have a double mission. On the one hand the scientific-technical knowledge obtained in the practical classes is worked, to complete their understanding and to deepen in them developing diverse activities, from the typical resolution of problems to the discussion of practical cases. On the other hand, seminars are the natural forum in which to discuss in group the development of practical work, providing the necessary knowledge to bring it forward, or indicating where and how they can be acquired. The mission of the seminars is to promote the capacity for analysis and synthesis, critical reasoning, and problem-solving ability, beyond the simple realization of an experimental protocol.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

## Assessment

### Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Assessment of attitude and responsibility.	10%	0	0	CM29, KM36, SM32, SM33
Reports and questionnaires in each of the modules.	90% (total of the sum of each evaluation of each module according to their proportional weight)	8	0.32	

The subject Laboratory 1 is divided into eight Modules: Biomedical Bibliography (BB), Biochemistry 1 (BQ1), Biochemistry 2 (BQ2), Cell Biology (BC), Genetics (G), Microbiology and Virology (MV), Histology (H) and, finally, Physiology (F). Each one of these Modules is evaluated independently.

To be able to attend lab sessions, the student must prove that has passed the biosafety and safety tests that can be found in the Moodle of the Faculty and be aware of and accept the operating rules of the UAB and the laboratories of the Faculty of Biosciences.

The evaluation of each one of the modules of this subject can include different written tests, the laboratory work and / or the elaboration of different types of works, according to the decision of the responsible teachers of each Module.

Given that attendance at scheduled activities in these subjects is mandatory, the absence of any of them must be justified. In order to pass the subject, a global attendance of at least 75% of the sessions programmed in each Module is required, as well as the minimum qualification set for each Module. A student will be considered "Not Evaluable" when he or she has attended less than 20% of the scheduled sessions.

To pass the subject it will be necessary that the final grade of the subject is equal to or greater than 5. This final grade will be the weighted average of the final marks of each module, as long as the mark of each module is equal to or greater than 4, according to the following formula:

$$\text{Note Lab 1} = ((\text{BB} \times 0.5) + (\text{BQ1}) + (\text{BQ2}) + (\text{BC}) + (\text{G}) + (\text{MV} \times 0.5) + (\text{H} \times 0.5) + (\text{F} \times 0.5)) \times 1/6$$

Students who do not obtain the minimum qualification required in every one of the Modules will not pass the subject. In this case, the maximum final grade of the subject will be a 4. After the second registration, the repeating students will only have to evaluate the specific Modules that were not previously passed. There is no possibility for improving grades, except in the case of repeaters.

This subject does not provide for the single evaluation system, given its exclusively practical typology.

## Bibliography

Basic General Bibliography:

- 1) Practical Approach Series (Enzyme assays, Basic cell cultures, Human cytogenetics, Gel electrophoresis, etc.). 2000-2002, Oxford University Press.
- 2) Aula Virtual de l'Autònoma Interactiva: <https://cv2008.uab.cat>

This and many other bibliography, as well as information on UAB libraries, can be found in telematic form in the next links:

<https://mirades.uab.cat/ebs/>

<https://ddd.uab.cat/record/22492>

## Software

1.- Microsoft Teams

2.- <https://www.cgl.ucsf.edu/chimerax/>

## Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this [link](#). To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(PLAB) Practical laboratories	511	Catalan/Spanish	annual	morning-mixed
(PLAB) Practical laboratories	512	Catalan/Spanish	annual	morning-mixed
(PLAB) Practical laboratories	513	Catalan/Spanish	annual	morning-mixed