

**Cellular Culture**

Code: 100887  
ECTS Credits: 3

Degree	Type	Year	Semester
2500252 Biochemistry	OB	2	1

**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**

There are not

**Objectives and Contextualisation**

Cell Culture course is taught in the 2nd semester of the 2nd year of the Biochemistry studies in the Faculty of Biosciences. This is a subject with a certain degree of expertise that is intended to acquire a basic knowledge to work in a cell culture laboratory. It is therefore a subject with an important practical component.

**Course objectives:**

- 1) To know the basic equipment of a laboratory cultures.
- 2) To know the basic methodologies used in cell cultures.

**Skills**

- Apply general laboratory security and operational standards and specific regulations for the manipulation of different biological systems.
- Apply the principal techniques used in biological systems: methods of separation and characterisation of biomolecules, cell cultures, DNA and recombinant protein techniques, immunological techniques, microscopy techniques, etc.
- Collaborate with other work colleagues.
- Design and prepare laboratory protocols, including health and safety aspects.
- Design experiments and understand the limitations of experimental approaches.
- Interpret experimental results and identify consistent and inconsistent elements.
- Process cells and tissues to obtain purified sub-cellular organelle preparations, and characterise them biochemically and structurally.
- Think in an integrated manner and approach problems from different perspectives.

**Learning outcomes**

1. Apply techniques for culturing eukaryotic cells.

2. Assess experimental data in relation to the values published in the scientific literature.
3. Collaborate with other work colleagues.
4. Design experiments and understand the limitations of experimental approaches.
5. Explain the fundamental theory behind basic and advanced techniques in biochemistry.
6. Explain the fundamental theory behind microscopy and centrifuging techniques, and the instrumentation used.
7. Interpret experimental results and identify consistent and inconsistent elements.
8. Monitor and interpret experiment protocols from a critical perspective.
9. Think in an integrated manner and approach problems from different perspectives.
10. Use the appropriate methodology for studying the different types of biological samples.
11. Use the established methods for eliminating the different types of waste products from a biochemistry and molecular biology laboratory.

## Content

### Lectures

#### 0. Key events in the development of cell culture

1. Basic equipment and organization of a cell culture laboratory
2. Basic principles of cell cultures
3. Physicochemical conditions and cell culture media
4. Cryopreservation
5. Cell lines and production
6. Characterization
7. Contamination
8. Quantification, cytotoxicity tests and cell death
9. Synchronization
10. Immortalization
11. Surfaces and scale up
12. Organ cultures

### Program of practical sessions

- Subculture of cell lines
- Cytogenetic and immunolabelling characterization
- Establishment of a cell growth curve
- Freezing and thawing in different conditions. Recovery rate.

## Methodology

The Cell Culture course consists of theory lectures and practical classes in the laboratory.

The theoretical lectures will be conducted using audiovisual material prepared by the teacher. This material will be accessible to the students in the UAB Moodle before the session.

The practical classes are designed to teach students in the use of laboratory instruments and to complement the theory knowledge. Students will do five practice sessions of 16 h in total. Students will work in groups of two persons, and at the end of each practice should fill out a sheet with their results. These sheets will be in possession of teachers and will be used to evaluate the students work, together with the final report compiled by the students that should be submitted to the teacher 15 days after the completion of the sessions.

## Activities

Title	Hours	ECTS	Learning outcomes
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Type: Directed

Laboratory practices	16	0.64	2, 3, 8, 7, 11, 10
Lectures	10	0.4	1, 4, 5, 6, 9
<b>Type: Supervised</b>			
Tutorials	6	0.24	1, 2, 3, 8, 4, 5, 6, 7, 9, 11, 10
<b>Type: Autonomous</b>			
Study	38	1.52	1, 2, 3, 8, 4, 5, 6, 7, 9, 11, 10

## Evaluation

The evaluation will consist in four activities:

- 1) **Test.** Represents **35% of the final score.**
- 2) **Written exam.** Represents **35% of the final score.**
- 3) **Results of laboratory Practices.** Represent **25% of the final score.** The score of this part will be obtained according with the results obtained. Attendance to practical sessions is mandatory. Not attending one of the sessions will penalize the score of this part by 25%. Students missing more than 20% of programmed sessions (two or more sessions) will be graded as "No Avaluable".
- 4) **Laboratory practices report.** Represents **5% of the final score.**
- 5) **To pass the course requires a minimum global score of 5, with a minimum of 3 in each of the parts.**

**The students that did not pass, have the opportunity of a retake that will consist of two exams, one written and another test.** The parts "Results of laboratory Practices" and "Laboratory practices report" are excluded from the retake process. To be eligible for the retake process, the student should have been previously evaluated in a set of activities equaling at least two thirds of the final score of the course or module. Thus, the student will be graded as "No Avaluable" if the weighthin of all conducted evaluation activities is less than 67% of the final score.

## Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Laboratory practices results	25%	0.5	0.02	1, 2, 3, 8, 5, 6, 7, 9, 11, 10
Laboratory report	5%	1	0.04	1, 2, 4, 7
Test	35%	1.5	0.06	2, 6, 7, 11, 10
Written exam	35%	2	0.08	8, 4, 5, 6, 7, 9, 10

## Bibliography

\* R.I. Freshney. Culture of Animal Cells: A manual of basic technique and specialized applications. 7<sup>th</sup> Ed. Wiley-Liss, Inc. 2016. Free access to 6th edition from UAB.

\* A. Doyle and J.B. Griffiths Eds. Cell and Tissue Culture: Laboratory procedures in biotechnology. John Wiley & Sons Ltd. 1999.

\* J.P. Mather and D. Barnes Eds. Animal Cell Culture Methods. Methods in Cell Biology. Academic Press. 1998.