

# SYLLABUS

## Cell cultures

University year: 2026-2027

### 1. Information regarding the programme

1.1. Higher education institution	Babeş-Bolyai University
1.2. Faculty	Biology and Geology
1.3. Department	Molecular Biology and Biotechnology
1.4. Field of study	Biology
1.5. Study cycle	Master, 2 years (4 semesters)
1.6. Study programme/Qualification	Molecular Biotechnology
1.7. Form of education	Full-time education

### 2. Information regarding the discipline

2.1. Name of the discipline	<b>Cell cultures</b>	Discipline code	<b>BME1302</b>				
2.2. Course coordinator	Alexandra Ciorîță						
2.3. Seminar coordinator	Alexandra Ciorîță						
2.4. Year of study	2	2.5. Semester	3	2.6. Type of evaluation	C	2.7. Discipline regime	DS

### 3. Total estimated time (hours/semester of didactic activities)

3.1. Hours per week	<b>4</b>	of which: 3.2 course	<b>2</b>	3.3 seminar/laboratory	<b>2</b>
3.4. Total hours in the curriculum	56	of which: 3.5 course	28	3.6 seminar/laborator	<b>28</b>
<b>Time allotment for individual study (ID) and self-study activities (SA)</b>					<b>hours</b>
3.5.1. Learning using manual, course support, bibliography, course notes (SA)					40
3.5.2. Additional documentation (in libraries, on electronic platforms, field documentation)					10
3.5.3. Preparation for seminars/labs, homework, papers, portfolios and essays					10
3.5.4. Tutorship					2
3.5.5. Evaluations					2
3.5.6. Other activities: Thematics					34
<b>3.7. Total individual study hours</b>					<b>98</b>
<b>3.8. Total hours per semester</b>					<b>154</b>
<b>3.9. Number of ECTS credits</b>					<b>6</b>

### 4. Prerequisites (if necessary)

4.1. curriculum	General cytology, Biochemistry, General chemistry, Cellular and Molecular Biology
4.2. competencies	<ul style="list-style-type: none"><li>• Light microscopy</li><li>• Concentrations</li><li>• Scientific papers</li><li>• Electronic platforms (Socrative, Mentimeter etc.)</li><li>• Lab equipment</li></ul>

### 5. Conditions (if necessary)

5.1. for the course	Logistic video support Electronic support BBU libraries
5.2. for the seminar /lab activities	Minimum 80% attending at the practical courses will ensure the participation to the exam

## 6. Specific competencies acquired

### 6.1. Competencies resulting from the completion of the degree programme (as referred to in the curriculum)

Professional competencies	
Competency code	Competency
CP1	Apply safety procedures in laboratory, conduct research across discipline, apply scientific method, manage research data, draft scientific or academic papers and technical documentation
CP2	Develop scientific theories, assist scientific research, manage research data, apply research ethics and scientific integrity principles in research activities
Transversal competencies	
Competency code	Competency
CT1	Promote the transfer of knowledge, conduct research across disciplines, manage findable accessible interoperable and reusable data

### 6.2. Learning outcomes relevant to the degree programme (as referred to in the curriculum)

Learning outcomes targeted by the subject		
Competency code	Knowledge and comprehension	Specific academic skills
CP4	1. The student explains the theoretical principles of modern biochemical and biophysical analysis techniques.	

Professional/essential competencies	<ul style="list-style-type: none"> <li>Understanding the behavior of cells in culture, acquiring the necessary knowledge to initiate cell cultures and use them for scientific or industrial purposes</li> <li>Establishing the risks associated with cell cultures</li> <li>Modification and adaptation of cell cultures to specific objectives</li> <li>Conceiving the experimental design, obtaining measurement data, analyzing/interpreting them, and formulating conclusions</li> </ul>
Transversal competencies	<ul style="list-style-type: none"> <li>Accomplishing the transfer of information, taking and using for the understanding of cell cultures knowledge from related fields: general cytology, animal physiology, biochemistry (metabolism), and genetics</li> <li>Using already known notions in new contexts</li> <li>The use of theoretical notions in solving practical problems</li> <li>Developing the ability to work in a team</li> </ul>

## 7. Subject-specific learning outcomes

<b>Knowledge and comprehension</b>
<ol style="list-style-type: none"> <li>Knowledge of the general principles of cultivation and use of animal cells Explain the cellular and molecular mechanisms of pathology</li> <li>Acquiring the necessary/complementary information to assimilate the content of the subjects of general cytology, biochemistry, animal physiology</li> </ol>
<b>Specific academic skills</b>
<ol style="list-style-type: none"> <li>Introduction to cell culture techniques of students who do not have experience in the field and ensuring the minimum knowledge necessary to organize a culture laboratory</li> <li>Presentation of cell culture concepts and technologies at different levels</li> <li>Development of the capacity for analysis and synthesis, the capacity to design and carry out experiments</li> </ol>

## 8. Content

8.1 Course	Teaching methods	Remarks
1. Introduction to cell culture biology	Frontal lectures, team discussions, debates, didactic	
2. Setting up a cell culture laboratory - International Standard Organization – ISO: protocols, safety, validation		

3. Contamination in the cell culture laboratory: Prevention and solutions	games, case studies, viewing educational videos	
4. Culture media: selection criteria		
5. Primary and secondary cultures		
6. 2D and 3D cell cultures		
7. Implementation of acquired notions in the biomedical environment		
8. Organoids		
9. Cell viability assays		
10. Membrane integrity tests		
11. Notions of cell biology – division, senescence, apoptosis and necrosis		
12. Biomedicine – the utility of acquired knowledge for medical applications		
13. Nanomaterials science – biocompatibility and biofunctionalization		
14. Applicability of the discipline to the labor market		

#### Bibliography

- MATHER, J. P., ROBERTS, P. E., 2002: Introduction to cell and tissue culture, Plenum Press, New York (Biblioteca de Fiziologie animală, uz intern - format electronic pus la dispoziție de cadrul didactic)
- DAVIS, J., 2011: Animal cell culture: essential methods, Chichester, Wiley-Blackwell (Biblioteca de Fiziologie animală)
- FRESHNEY, J., 2016: Culture of animal cells: a manual of basic technique and specialized applications, 7th ed., Wiley-Blackwell (Biblioteca de Fiziologie animală și Biblioteca de Zoologie)
- BHATT, S., 2011: Animal cell culture: concept and application, Alpha Science Int., Oxford (Biblioteca de Fiziologie animală)
- LANG, C, 2020: Culturi de celule, suport de curs [F1-F14].

#### Optional references

- Mescher A, Junqueira's Basic Histology Text and Atlas, 14th Ed. McGraw Hill India, 2016.
- Ross MH, Pawlina W. Histology A Text and Atlas With Correlated Cell and Molecular Biology, 7th ed. Wolters Kluwer. 2015
- Alberts B, Johnson A, Lewis J, Raff M, Roberts K, Walter P. Molecular Biology of the Cell, 6th Ed. Garland Publishing, New York, 2014.
- Alberts B, Johnson A, Lewis J, Raff M, Roberts K, Walter P, Molecular Biology of the Cell, 5th Ed. Garland Publishing, New York, 2008.
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- Brady ST, Siegel GJ, Albers RW, Price DL. Principles of Molecular, Cellular, and Medical Neurobiology, 8th Edition, Academic Press, 2011.
- Dashek WV, Harrison M. Plant Cell Biology, 1st Edition, CRC Press. 2010.
- Hunt T, Wilson J, The Problems Book: for Molecular Biology of the Cell, 6th Edition, Garland Science, 2015.
- Kuehnel W, Color Atlas of Cytology, Histology, and Microscopic Anatomy, 4th Edition, 2003.
- Lodish H, Berk A, Kaiser CA, Krieger M., Scott MP, Bretscher A, Ploegh H, Matsudaira P, Molecular Cell Biology, 6th Edition, 2007.
- Lodish H, Berk A, Kaiser CA, Krieger M, Bretscher A, Ploegh H, Amon A, Martin KC, Molecular Cell Biology, 8th Edition, 2014.

8.2 Seminar / laboratory	Teaching methods	Remarks
1. Presentation of the way of carrying out the works; establishing work pairs and establishing the order of rotation; laboratory protection norms and PSI norms.	Frontal lecture	
2. Sterility test		
3. Preparation of special culture media	Practical activity, subgroups of 2-3 students	
4. The process of thawing cell cultures from -80°C stock		
5. Cell culture passage		
6. Applying a treatment to cell cultures		
7. Examination of cell cultures treated by biochemical techniques		



Date:  
09.04.2026

Signature of course coordinator

Ciorîță Alexandra

Signature of seminar coordinator

Ciorîță Alexandra

Date of approval:  
09.04.2026

Signature of the head of department

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