SYLLABUS CELL CULTURE

1. Information regarding the program

1.1 Higher education institution	Babeș-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 program/Qualification	Molecular Biotechnology

2. Information regarding the discipline

2.1 Name of the discipline	Cell cultures (BME1302)						
2.2 Course coordinator			Ș.l. dr. Alexandra Ciorîță				
2.3 Seminar coordinator			Ș.l. dr. Alexandra Ciorîță				
2.4 Year	2	2.5 Semester	3	2.6. Evaluation type	C	2.7 Discipline type	DS

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

3.1 Hours/week	4	Out of which: 3.2 course	2	3.3 seminar/laboratory	2
3.4 Total hours in the curriculum	56	Out of which: 3.5 course	28	3.6 seminar/laboratory	28
Time allotment:					h
Learning using manual, course support, bibliography, course notes					40
Additional documentation (in libraries, on electronic platforms, field documentation)					10
Preparation for seminars/labs, homework, papers, portfolios and essays					10
Tutorship					2
Examination					4
Other activities: Tematics					32

3.7 Total individual study hours	98
3.8 Total hours/semester	154
3.9 Number of ECTS credits	6

4. Prerequisites (where necessary)

4.1 Curriculum	General cytology, Biochemistry, General chemistry, Cellular and Molecular Biology
4.2 Competences	• Light microscopy • Concentrations • Scientific papers • Electronic platforms (Socrative, Mentimeter etc.) • Lab equipment

5. Conditions (where necessary)

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

6. Specific competencies acquired

Professional competencies	• Understanding the behavior of cells in culture, acquiring the necessary knowledge to initiate cell cultures and use them for scientific or industrial purposes • Establishing the risks associated with cell cultures • Modification and adaptation of cell cultures to specific objectives • Conceiving the experimental design, obtaining measurement data, analyzing/interpreting them, and formulating conclusions
Transversal competencies	• 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 • Using already known notions in new contexts • The use of theoretical notions in solving practical problems • Developing the ability to work in a team

7. Objectives of the discipline (outcome of the acquired competencies**)**

7.1 General objective of the discipline	Knowledge of the general principles of cultivation and use of animal cells
7.2 Specific objective of the discipline	• Acquiring the necessary/complementary information to assimilate the content of the subjects of general cytology, biochemistry, animal physiology • 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 • Presentation of cell culture concepts and technologies at different levels • Development of the capacity for analysis and synthesis, the capacity to design and carry out experiments

8. Content

8.1 Course	Teaching style	Obs
1. Introduction to cell culture biology	Frontal lectures, team discussions, debates, didactic games, case studies, viewing educational videos	
2. Setting up a cell culture laboratory - International Standard Organization – ISO: protocols, safety, validation		
3. Contamination in the cell culture laboratory: Prevention and solutions		
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		

References

1. 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)
2. DAVIS, J., 2011: Animal cell culture: essential methods, Chichester, Wiley-Blackwell (Biblioteca de Fiziologie animală)
3. 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)
4. BHATT, S., 2011: Animal cell culture: concept and application, Alpha Science Int., Oxford (Biblioteca de Fiziologie animală)
5 LANG, C, 2020: Culturi de celule, suport de curs [F1-F14].

Optional references
1. Mescher A, Junqueiras Basic Histology Text and Atlas, 14th Ed. McGraw Hall India, 2016.
2. Ross MH, Pawlina W. Histology A Text and Atlas With Correlated Cell and Molecular Biology, 7th ed. Volters Kluwel. 2015
3. Alberts B, Johnson A, Lewis J, Raff M, Roberts K, Walter P. Molecular Biology of the Cell, 6th Ed. Garland Publishing, New York, 2014.
4. Alberts B, Johnson A, Lewis J, Raff M, Roberts K, Walter P, Molecular Biology of the Cell, 5th Ed. Garland Publishing, New York, 2008.
5. Alberts B, Johnson A, Lewis J, Raff M, Roberts K, Walter P. Molecular Biology of the Cell, 4th ed., Garland Publishing, New York, 2002. http://www.ncbi.nih.gov/entrez/query.fcgi?db=Books
6. Brady ST, Siegel GJ, Albers RW, Price DL. Principles of Molecular, Cellular, and Medical Neurobiology, 8th Edition, Academic Press, 2011.
7. Dashek WV, Harrison M. Plant Cell Biology, 1st Edition, CRC Press. 2010.
8. Hunt T, Wilson J, The Problems Book: for Molecular Biology of the Cell, 6th Edition, Garland Science, 2015.
9. Kuehnel W, Color Atlas of Cytology, Histology, and Microscopic Anatomy, 4th Edition, 2003.
10. Lodish H, Berk A, Kaiser CA, Krieger M., Scott MP, Bretscher A, Ploegh H, Matsudaira P, Molecular Cell Biology, 6th Edition, 2007.
11. 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 style	Obs
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	Practical activity, subgroups of 2-3 students	
3. Preparation of special culture media		
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		
8. Examination of treated cell cultures by microscopic techniques (photonic, electronic)		
9. Freezing cell cultures		
10. Carrying out an individual study. Analysis, synthesis and integration activities of a scientific text of your choice	Individual practical activity, confrontation of ideas, debate, argumentation - group activity	
11. Carrying out an individual study. Analysis, synthesis and integration activities of a scientific text of your choice		
12. Carrying out an individual study. Analysis, synthesis and integration activities of a scientific text of your choice		
13. Carrying out an individual study. Analysis, synthesis and integration activities of a scientific text of your choice.		
14. Evaluation (examination) of laboratory work	Practical examination	

References: Collection of reports for each laboratory work available at the department's library and online on the specialization's working group.

9. 1. Corroboration of the contents of the discipline with the expectations of representatives of the epistemic community, professional associations and representative employers in the field related to the program.

9.2. The course has a similar content to the courses in other European universities and takes into account the level of preparation of the students.

9.3. The course is fundamental for the development of working skills in various laboratories, but in which modern methods of investigating life, at the cellular and molecular level, are applied.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage
10.4 Course	Assimilation of informational content Enabling the use of concepts/notions	**Written exam**	**70%**
10.5 Seminar/laboratory	• Skills to work in the laboratory and to apply an experimental protocol • The ability to explain the protocol and the results obtained • Skills of analysis, synthesis and integration of a scientific text	Evaluation in the form of a practical application at the end of the semester; Scientific poster evaluation	**30%**
10.6 Minimal performance standards			
Knowing at least 50% of the information contained in the course Knowledge of at least 50% of the laboratory information			

Data completării (actualizare) **Semnătura titularului de curs** **Semnătura titularului de seminar**

11.07.2024

Ciorîță Alexandra Ciorîță Alexandra

Data avizării în departament **Semnătura directorului de departament**

21.07.2024 Assoc. Prof. Beatrice KELEMEN, PhD