COURSE SYLLABUS
CELL TYPE DIVERSITY DEVELOPMENT AND REGULATION

1. Data about the programme

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	2 years, Full Time
1.6 Study Programme / Qualification	Master/ Molecular Biotechnology

2. Date despre disciplină

2.1 Name of discipline	Cell Type Diversity Development and Regulation (in English) (BME1102)						
2.2 Teacher responsible for lectures	CSI dr. Tudor C. Badea						
2.3 Teacher responsible for seminars	CSI dr. Tudor C. Badea						
2.4 Year of study	1	2.5 Semester	1	2.6. Type of evaluation	C	2.7 Course framework	DS

3. Estimated total time of teaching activities (hours per semester)

3.1 Hours per week	4	Out of which: 3.2 Lectures	2	3.3 Seminars / Laboratory classes	2
3.4 Total hours in the curriculum	28	28	28	28	28
Allocation of study time:					ore
Study supported by textbooks, other course materials, recommended bibliography and personal student notes					14
Additional learning activities in the library, on specialized online platforms and in the field					26
Preparation of seminars / laboratory classes, topics, papers, portfolios and essays					14
Tutoring					14
Examinations					2
Other activities:					

3.7 Individual study (total hours)	70
3.8 Total hours per semester	126
3.9 Number of credits	5

4. Precondiţii (acolo unde este cazul)

4.1 Curriculum	• Genetics, Biochemistry, Cell and Molecular Biology	
4.2 Competences	• Interpretation of scientific information	

5. Conditions (where applicable)

5.1 Conducting lectures	• MS teams platform • Audio-video logistics	
5.2 Conducting seminars / laboratory classes	• Admission at final evaluation is conditioned by at least 80% attendance at the scheduled seminar/laboratory classes.	

6. Specific competences acquired

Professional competences	• The student achieves analytical and synthesis skills in Molecular Biology, Genetic Engineering, cell type classification, and strategies for repair, regeneration or replacement of tissues. • The student achieves analytical and synthesis skills of scientific information presented in English.
Transversal competences	• Acquisition of basic theoretical knowledge for future doctoral research in the field of Neuroscience, Molecular Biology, Genetic Engineering, Immunology, Molecular Biotechnologies. • Developing the ability to work alone or part of a team.

7. Course objectives (based on the acquired competencies grid)

7.1 The general objective of the course	• Acquiring general knowledge about cell type diversity, methods of studying cell types, and methods to manipulate cell types for scientific or therapeutic purposes.
7.2 Specific objectives	• Acquiring theoretical and practical knowledge about study and classification methodologies for cell types. • Acquiring theoretical and practical knowledge about cellular mechanisms that lead to cell type diversity. • Acquiring theoretical and practical knowledge about genetic manipulation techniques used in modern therapeutics.

8. Content

8.1 Lectures	Teaching Methods	Observations
1. Cell types as building blocks of living organisms. Properties and classification criteria.	In person or online on the MS teams platform. Interactive class participation	2 hours
2. General principles of cell type development. Cell division, cell type specification, cell type differentiation.	In person or online on the MS teams platform. Interactive class participation	2 hours
3. General principles of tissue morphogenesis.	In person or online on the MS teams platform. Interactive class participation	2 hours
4. Cell autonomous and transcriptional regulation of cell type formation.	In person or online on the MS teams platform. Interactive class participation	2 hours
7. Cell-Cell interactions in cell type development.	In person or online on the MS teams platform. Interactive class participation	2 hours
8. Molecular signals for cell type development.	In person or online on the MS teams platform. Interactive	2 hours

	class participation	
9. Neuronal Cell types	In person or online on the MS teams platform. Interactive class participation	2 hours
10. Immune system and Cancer - two particular cases of cell type diversification.	In person or online on the MS teams platform. Interactive class participation	2 hours
11. Molecular approaches to cell type study and manipulation.	In person or online on the MS teams platform. Interactive class participation	2 hours
13. Gene therapy	In person or online on the MS teams platform. Interactive class participation	2 hours
14. Cellular reprogramming, tissue replacement, repair and regeneration.	In person or online on the MS teams platform. Interactive class participation	2 hours

Bibliography

(1) Developmental Biology Scott F. Gilbert. 7th edition or 6th edition: https://www.ncbi.nlm.nih.gov/books/NBK9983/
(2) Molecular Biology of the Cell Alberts 5th edition or 4th edition: https://www.ncbi.nlm.nih.gov/books/NBK21054/
(3) Principles of Neuroscience Kandel Schwartz
(4) Purves Neuroscience
(5) Scientific articles from public databases (PubMed Central, SpringerLink ,etc.) accessed via „LUCIAN BLAGA" Central University Library of Cluj-Napoca, Anelis

8.2 Seminars / laboratory classes	Teaching Methods	Observations
Seminar: Students present papers relevant to the course material.	Seminar = student paper presentations and discussions.	16 ore
Laboratory: 1) Image Analysis using FIJI/IMAGEJ = Neuronal Reconstructions 2) Cell type classification based on gene expression profiling using hierarchical clustering (Matlab) 3) Gene expression discovery and datamining of associated information using publicly available databases.	Demonstration followed by individual implementation by the student based on assignment.	12 ore

Bibliography

Scientific articles from public databases (PubMed Central, SpringerLink ,etc.) accessed via „LUCIAN BLAGA" Central University Library of Cluj-Napoca, Anelis

9. Aligning the contents of the discipline with the expectations of the epistemic community representatives, professional associations and standard employers operating in the program field

- The course has a similar content to courses from other European universities, and is in sink with the students' expertise level.
- The course is essential for the development of analytical and synthesis skills in Biotechnology, Molecular Biology, Cell diversity, and modern approaches for tissue repair and regeneration.

10. Examination

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of

			the final grade
10.4 Lectures	Assessment of knowledge	Written Exam	50 %
10.5 Seminar/laboratory	Participation in the analysis exercises during laboratory sessions	Assesment during lab exercises.	25 %
	Ability to present and summarize scientific information.	Paper presentations	25 %
10.6 Minimum performance standard			
• Knowledge of 50% of the information content of the course • Involvement in at least 50% of the seminars activities.			

Completion date	Signature of the teacher Responsible for lectures	Signature of the teacher responsible for seminars /laboratory classess
20.02.2023	CS I dr. Tudor C. Badea	CS I dr. Tudor C. Badea

Date of approval in the department	Signature of Department Head
27.02.2023	Conf. Dr. Beatrice Kelemen