SYLLABUS

Biodiversity and climate change assessment

University year 2025-2026

1. Information regarding the programme

1.1. Higher education institution	**Babeș Bolyai University**
1.2. Faculty	**Faculty of Biology and Geology**
1.3. Department	**Department of Molecular Biology and Biotechnology**
1.4. Field of study	**Biology**
1.5. Study cycle	**Master**
1.6. Study programme/Qualification	**Bioinformatics applied in life sciences**
1.7. Form of education	**Full-time**

2. Information regarding the discipline

2.1. Name of the discipline	**Biodiversity and climate change assessment**					Discipline code	**BME1128**
2.2. Course coordinator					**CS II dr. Turtureanu Pavel Dan**		
2.3. Seminar coordinator					**CS II dr. Turtureanu Pavel Dan**		
2.4. Year of study	**I**	2.5 Semester	**2**	2.6. Type of evaluation	**E**	2.7 Type of discipline	**Elective**

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

3.1 Hours per week	**4**	Of which: 3.2 course	**2**	3.3 seminar/laboratory	**2**
3.4 Total hours in the curriculum	**56**	Of which: 3.5 course	**28**	3.6 seminar/laboratory	**28**
Time allotment for individual study (ID) and self-study activities (SA)					**hours**
Learning using manual, course support, bibliography, course notes					24
Additional documentation (in libraries, on electronic platforms, field documentation)					18
Preparation for seminars/labs, homework, papers, portfolios and essays					16
Tutorship					8
Evaluations					4
Other activities:					
3.7. Total individual study hours	70				
3.8. Total hours per semester	126				
3.9. Number of ECTS credits	5				

4. Prerequisites (if necessary)

4.1. curriculum	Database, statistics
4.2. competencies	Programming skills

5. Conditions (if necessary)

5.1. for the course	Videoprojector
5.2. for the seminar /lab activities	Computers, specific development environment

6.1. Specific competencies acquired [1]

Professional/essential competencies	• **C5.3** The ability to understand biodiversity concepts • **C5.4** Biodiversity asessment using multiple measures and indices • **C5.5** Climate change asessment using available datasets
Transversal competencies	• **CT1.** Application of efficient work rules and responsible attitudes towards the scientific domain, for the creative exploitation of one's own potential according to the principles and rules of professional ethics • **CT2.** Efficient conduct of activities organized in an interdisciplinary group and development of empathic capacity of interpersonal communication, networking and collaboration with diverse groups • **CT3.** Use of efficient methods and techniques for learning, information, research and development of abilities for knowledge exploitation, for adapting to the needs of a dynamic society and for communication in a widely used foreign language.

6.2. Learning outcomes

Knowledge	
Skills	
Responsibility and autonomy:	

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

7.1 General objective of the discipline	• To learn concepts and specific techniques used to assess biodiversity, as well as climate change and its consequences

[1] One can choose either competences or learning outcomes, or both. If only one option is chosen, the row related to the other option will be deleted, and the kept one will be numbered 6.

7.2 Specific objective of the discipline	• Students will learn concepts and gather various skills of integrating, structuring, storing/managing information on biodiversity and climate data for further assessments (particularly using R)

8. Content

8.1 Course	Teaching methods	Remarks
1. Introduction	• Interactive exposure • Presentation • Explanation • Practical examples • Case-study discussions	
2. The concept of number of species		
3. The concept of beta-diversity		
4. Multivariate investigation of biotic communities		
5. Functional diversity		
6. Relationships between biodiversity and environmental factors		
7. Biodiversity monitoring		
8. Terrestrial biomes and major climates		
9. Historical climate changes		
10. Ongoing climate changes		
11. Methods and techniques for climate change assessment		
12. Climate change effects on alpine biodiversity		
13-14. Students' presentations		

Bibliography

- Magurran, A.E. 2004. Measuring Biological Diversity. Blackwell Publishing, UK.
- Anderson, M. J., Crist, T. O., Chase, J. M., Vellend, M., Inouye, B. D., Freestone, A. L., ... & Swenson, N. G. (2011). Navigating the multiple meanings of β diversity: a roadmap for the practicing ecologist. Ecology letters, 14(1), 19-28.
- Turtureanu, P. D., Palpurina, S., Becker, T., Dolnik, C., Ruprecht, E., Sutcliffe, L. M., ... & Dengler, J. (2014). Scale-and taxon-dependent biodiversity patterns of dry grassland vegetation in Transylvania. Agriculture, Ecosystems & Environment, 182, 15-24.
- Puşcaş, M., & Choler, P. (2012). A biogeographic delineation of the European Alpine System based on a cluster analysis of Carex curvula-dominated grasslands. Flora-Morphology, Distribution, Functional Ecology of Plants, 207(3), 168-178.
- Puşcaş, M., Taberlet, P., & Choler, P. (2008). No positive correlation between species and genetic diversity in European alpine grasslands dominated by Carex curvula. Diversity and Distributions, 14(5), 852-861.
- Pauli, H., Gottfried, M., Dullinger, S., Abdaladze, O., Akhalkatsi, M., Alonso, J. L. B., ... & Grabherr, G. (2012). Recent plant diversity changes on Europe's mountain summits. Science, 336(6079), 353-355.
- Garnier, E., Navas, M-A., Grigulis, K. Plant Functional Diversity. Organism traits, community structure and ecosystem properties. Oxford, UK.

8.2 Seminar / laboratory	Teaching methods	Remarks
1. Sources of biodiversity data	• Interactive exposure • Explanation	
2. Numerical and statistical analysis of biodiversity in R		

3. Sources of climate data	• Conversation • Didactical demonstration	
4-6. Working with climate and biodiversity data in R		
7. Students' project presentations		

Bibliography

- Magurran, A.E. 2004. Measuring Biological Diversity. Blackwell Publishing, UK.
- Anderson, M. J., Crist, T. O., Chase, J. M., Vellend, M., Inouye, B. D., Freestone, A. L., ... & Swenson, N. G. (2011). Navigating the multiple meanings of β diversity: a roadmap for the practicing ecologist. Ecology letters, 14(1), 19-28.
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9. Corroborating the content of the discipline with the expectations of the epistemic community, professional associations and representative employers within the field of the program

- The course is already included in the curriculum of many universities in the world.
- The content of this course is considered important by all research entities, as well as those focused on nature conservation and the management of natural resources

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of final grade
10.4 Course	Know concepts and methods from the domain of biodiversity and climate	Test of theoretical knowledge	50%
10.5 Seminar/laboratory	Apply biodiversity analysis and climate in real problems	Project implementation and presentation	50%
10.6 Minimum standard of performance			

Each student must obtain at least 5 for the theoretical test and for the project presentation in order to receive the final grade. To obtain a grade of at least 5, the student must demonstrate mastery of the basic concepts of biodiversity and climate.

11. Labels ODD (Sustainable Development Goals)[2]

	General label for Sustainable Development							
								
								

Date:
17.01.2025

Signature of course coordinator

CS II dr. Pavel Dan Turtureanu

Signature of seminar coordinator

CS II dr. Pavel Dan Turtureanu

Date of approval:
20.01.2025

Signature of the head of department

Conf. dr. Beatrice Kelemen

[2] Keep only the labels that, according to the *Procedure for applying ODD labels in the academic process*, suit the discipline and delete the others, including the general one for *Sustainable Development* – if not applicable. If no label describes the discipline, delete them all and write „*Not applicable.*".