SYLLABUS

1. Information regarding the programme

1.1 Higher education institution	**Babeş 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**

2. Information regarding the discipline

2.1 Name of the discipline (en) (ro)			**Databases for metacommunity ecology** **Baze de date pentru ecologia metacomunităților**				
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	**1**	2.5 Semester	**2**	2.6. Type of evaluation	**E**	2.7 Type of discipline	**Elective**
2.8 Code of the discipline	**BME1126**						

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:					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	• Statistics
4.2. competencies	• Programming skills in R

5. Conditions (if necessary)

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

6. Specific competencies acquired

Professional competencies	**C5.3** Integration of ecological information into accessible, digital systems **C5.4** Quality evaluation of ecological databases in terms of structure, functionality and extensibility **C5.5** The ability to restructure, extract and perform exploratory analyses on information derived from ecological databases
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.

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

7.1 General objective of the discipline	• To learn concepts and specific techniques to create, manage and perform exploratory analyses on databases for meta-community ecology
7.2 Specific objective of the discipline	• Students will learn various techniques to integrate, structure, store/manage databases for further analyses using specific software (particularly R)

8. Content

8.1 Course	Teaching methods	Remarks
1. Introduction	• Interactive exposure • Presentation • Explanation • Practical examples • Case-study discussions	
2. Sources of ecological data		
3. Data types used in meta-community ecology		
4. Formating and integrating ecological data		
5. Automatic data manipulation		
6-7. Numerical exploratory analyses		
8. Graphical exploratory analysis		
9. Ecological databases (abiotic)		
10. Species distribution databases		
11. Vegetation databases		
12. Ecological monitoring databases		
13-14. Students' presentations		

Bibliography

1. Spector, P. 2008. Data manipulation with R. Springer, Printforce, Netherlands.
2. Logan, M. 2010. Biostatistical Design and Analysis Using R. Wiley-Blackwell, India.
3. Wildi, O. 2017. Data analysis in vegetation ecology. CABI, UK.
4. Chang, W. 2019. R Graphics Cookbook. Practical recipes for visualizing data. O'Reilly, USA.

<table>
<tr><td colspan="3">Quinn, G.P., Keough, M.J., Experimental Design and Data Analysis for Biologists. Cambridge University Press, UK.</td></tr>
<tr><td>8.2 Seminar / laboratory</td><td>Teaching methods</td><td>Remarks</td></tr>
<tr><td>1. Preparation and integration of ecological databases</td><td rowspan="5">• Interactive exposure
• Explanation
• Conversation
• Didactical demonstration</td><td rowspan="5"></td></tr>
<tr><td>2. R programming language for ecological databases</td></tr>
<tr><td>3. Numerical and graphical exploratory analysis in R</td></tr>
<tr><td>4-6. Investigating ecological databases</td></tr>
<tr><td>7. Students’ project presentations</td></tr>
<tr><td colspan="3">Bibliography
1. Spector, P. 2008. Data manipulation with R. Springer, Printforce, Netherlands.
2. Logan, M. 2010. Biostatistical Design and Analysis Using R. Wiley-Blackwell, India.
3. Wildi, O. 2017. Data analysis in vegetation ecology. CABI, UK.
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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

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the grade (%)
10.4 Course	Know concepts and methods from the domain of ecological and knowledge discovery	Test of theoretical knowledge	50%
10.5 Seminar/lab activities	Apply ecological data manipulating techniques in real problems	Project implementation and presentation	50%
10.6 Minimum performance standards			
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 ecological data preparation for analysis.			

Date	Signature of course coordinator	Signature of seminar coordinator
13.06.2024	**CS II dr. Pavel Dan Turtureanu**	**CS II dr. Pavel Dan Turtureanu**

Date of approval	Signature of the head of department
14.06.2024	**Assoc. Prof. Beatrice Kelemen**