SYLLABUS

Databases for metacommunity ecology

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	**Databases for metacommunity ecology**					Discipline code	**BME1126**
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**

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	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

6.1. Specific competencies acquired [1]

[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.

Professional/essential 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.

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 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

<table>
<tr><td>8.1 Course</td><td>Teaching methods</td><td>Remarks</td></tr>
<tr><td>1. Introduction</td><td rowspan="13">• Interactive exposure
• Presentation
• Explanation
• Practical examples
• Case-study discussions</td><td rowspan="13"></td></tr>
<tr><td>2. Sources of ecological data</td></tr>
<tr><td>3. Data types used in meta-community ecology</td></tr>
<tr><td>4. Formating and integrating ecological data</td></tr>
<tr><td>5. Automatic data manipulation</td></tr>
<tr><td>6-7. Numerical exploratory analyses</td></tr>
<tr><td>8. Graphical exploratory analysis</td></tr>
<tr><td>9. Ecological databases (abiotic)</td></tr>
<tr><td>10. Species distribution databases</td></tr>
<tr><td>11. Vegetation databases</td></tr>
<tr><td>12. Ecological monitoring databases</td></tr>
<tr><td>13-14. Students’ presentations</td></tr>
<tr><td colspan="3">Bibliography
• Spector, P. 2008. Data manipulation with R. Springer, Printforce, Netherlands.
• Logan, M. 2010. Biostatistical Design and Analysis Using R. Wiley-Blackwell, India.
• Wildi, O. 2017. Data analysis in vegetation ecology. CABI, UK.
• Chang, W. 2019. R Graphics Cookbook. Practical recipes for visualizing data. O’Reilly, USA.
• 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
• Spector, P. 2008. Data manipulation with R. Springer, Printforce, Netherlands.
• Logan, M. 2010. Biostatistical Design and Analysis Using R. Wiley-Blackwell, India.
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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 ecological and knowledge discovery	Test of theoretical knowledge	50%
10.5 Seminar/laboratory	Apply ecological data manipulating techniques 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 ecological data preparation for analysis.

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

	General label for Sustainable Development							
								

[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.*".

Date:	Signature of course coordinator	Signature of seminar coordinator
17.01.2025	**CS II dr. Pavel Dan Turtureanu**	**CS II dr. Pavel Dan Turtureanu**

Date of approval:	Signature of the head of department
20.01.2025	**Conf. dr. Beatrice Kelemen**