COURSE DESCRIPTION

Plant and Animal Biocoenology (Community Ecology)

Academic year 2026-2027

1. Programme-related data

1.1. Higher Education Institution	Babeș-Bolyai University
1.2. Faculty	Biology and Geology
1.3. Department	Taxonomy and Ecology
1.4. Field	Biology
1.5. Level of study	Master (2 years)
1.6. Degree programme / Qualification	Systemic Ecology and Conservation / Master
1.7. Form of education	Face-to-face instruction

2. Course-related data

2.1. Course title	Plant and Animal Biocoenology			Course code	BME3301
2.2. Course coordinator	Dan Gafta				
2.3. Seminar coordinator	Dan Gafta				
2.4. Year of study	2	2.5. Semester	3	2.6. Type of assessment	Exam
2.7. Course status	Compulsory			2.8. Course type	Core subject

3. Total estimated time (hours per semester of teaching activities)

3.1. Number of hours per week	4	of which: 3.2. course	2	3.3. seminar/ laboratory/ project	2
3.4. Total of hours in the curriculum	56	of which: 3.5. course	28	3.6. seminar/ laboratory	28
Time allocation for individual study (IS) and self-taught activities (ST)					**hours**
Learning from textbooks, course materials, bibliography, and notes (IS)					40
Additional research in the library, on subject-specific electronic platforms, and on-site					15
Preparing seminars/ laboratories/ projects, assignments, reports, portfolios, and essays					24
Tutoring (professional guidance)					10
Examinations					5
Other activities					
3.7. Total hours of individual study (IS) and self-taught activities (ST)				**94**	
3.8. Total hours per semester				**150**	
3.9. Number of credits				**6**	

4. Prerequisites (where applicable)

4.1. curriculum-related	Principles of Systemic Ecology
4.2 skills-related	Tabular calculations and graph production in electronic spreadsheets Report preparing

5. Specific conditions (where applicable)

5.1. course-related	Logistic support (computer for each student)
5.2. seminar/laboratory-related	Logistic support (laptop/computer running Windows 10/11 for each student) Software for numerical analysis (R) Real and simulated data sets in electronic format Compulsory attendance of students at minim 80% of the seminars

6.1. Competencies resulting from the completion of the degree programme ***(as referred to in the curriculum)***

Professional competencies	
Competency code	**Competency**
PC3	Collect biological data, apply scientific methods, gather experimental data, perform scientific research, collect samples for analysis, perform field research, perform laboratory tests
Transversal competencies	
Competency code	**Competency**
TC1	Working with numbers and measures: calculate probabilities, carry out calculations, interpret mathematical information, process spatial information, working with digital devices and applications

6.2. Learning outcomes relevant to the degree programme (as referred to in the curriculum)

Learning outcomes targeted by the subject		
Competency code	**Knowledge and comprehension**	**Specific academic skills**
PC3	Graduates apply the theoretical principles of basic biological sciences (such as genetics, anatomy, physiology, histology, etc.) in the field of environmental research.	Abolventii integreaza metodele stiintelor biologice de sinteza in analizele componentelor mediului.
TC1	Graduates demonstrate an informed understanding of digital devices and applications and their use in accessing, managing, and communicating academic and professional information.	Graduates effectively use digital devices and applications to collect, process, analyze, and communicate data and information in academic and professional contexts.

7. Subject-specific learning outcomes

Knowledge and comprehension
1. Understanding the mechanisms by which various abiotic factors, species traits and interspecific interactions drive the structure, dynamics and diversity of ecological communities
2. Knowledge of methods of quantitative analysis that allow for unravelling patterns (assembly rules) in biocoenotic organisation and functioning
Specific academic skills
1. Ability to perform quantitative analyses on ecological communities in terms of species composition, relationships with the abiotic factors and taxonomic/functional diversity
2. Ability to detect specific patterns associated with the structure, dynamics and diversity of ecological communities

8. Contents

8.1. Course	**Teaching and learning methods**	**Remarks**
Current theories about the concept of ecological community (biocoenosis)	Lecture with video presentation support	
Sampling the terrestrial communities	Lecture with video presentation support	
Compositional dissimilarity of ecological communities: species nestedness and turn-over	Lecture with video presentation support	

Functional approach in studying ecological communities: functional types and ecological strategies	Lecture with video presentation support	
Interspecific relationships driving the structure and dynamics of ecological communities	Lecture with video presentation support	
Models of species co-existence in communities	Lecture with video presentation support	
Modelling the distribution of species abundance in ecological communities	Lecture with video presentation support	
Organisation of ecological communities	Lecture with video presentation support	
Disturbance and community stability: inertia and resilience	Lecture with video presentation support	
Predictability of ecological successions	Lecture with video presentation support	
Multispecific spatial structure of ecological communities	Lecture with video presentation support	
Ecological determinism and functional role of the species/functional diversity at community level	Lecture with video presentation support	
Estimating the alpha, beta and gamma diversity	Lecture with video presentation support	
Extrapolating the island biogeography theory to the study of the structure of ecological communities	Lecture with video presentation support	

Bibliography

Begon M., Townsend C.R., 2021. Ecology: from Individuals to Ecosystems. 5th edition. Blackwell, Oxford.
Garnier E., Navas M.L., Grigulis K., 2016. Plant Functional Diversity. Oxford University Press, Oxford.
Magurran A.E., 2013. Measuring Biological Diversity. Wiley-Blackwell, Chichester.
Morin P.J., 2011. Community Ecology. Wiley-Blackwell, Chichester.
Sher A., Molles M., 2021. Ecology: concepts and applications. 9th edition. McGraw-Hill, New York.

8.2. Seminar/ laboratory	**Teaching and learning methods**	**Remarks**
Fitting the empirical distribution of cumulative relative abundance of the species composing an ecological community	Practical application on computer	
Estimation of alpha- and beta-diversity within-communities and respectively, between-communities	Practical application on computer	
Analysis of the specific dissimilarity between two or more groups of communities (ANOSIM)	Practical application on computer	
Estimation of species richness through the procedure of species rarefaction and extrapolation	Practical application on computer	
Estimation of functional diversity at community level	Practical application on computer	
Predicting the species composition of communities along successions through the method of Markov chains	Practical application on computer	
Estimating the width and overlap of ecological niches pertaining to the co-occurring species in communities	Practical application on computer	
Analysis of species patterns between communities: nestedness and turn-over	Practical application on computer	
Working out a project reporting the structural analysis of a set of ecological communities at student's choice	Working independently on data analysis and reporting the results	The report elaboration covers six seminars (12 hours)

Bibliography

Gardener M., 2014. Community Ecology - Analytical Methods Using R and Excel. Pelagic Publishing, Exeter.
vegan: Community Ecology Package (https://cran.r-project.org/web/packages/vegan/vegan.pdf)
vegetarian: Jost Diversity Measures for Community Data (https://cran.r-project.org/web/packages/vegetarian/vegetarian.pdf)
coenocliner: Coenocline Simulation (https://cran.r-project.org/web/packages/coenocliner/coenocliner.pdf)
EcoSimR: Null Model Analysis for Ecological Data (https://cran.r-project.org/web/packages/EcoSimR/EcoSimR.pdf)
betapart: Partitioning Beta Diversity into Turnover and Nestedness Components (https://cran.r-project.org/web/packages/betapart/betapart.pdf)
cooccur: Probabilistic Species Co-Occurrence Analysis (https://cran.r-project.org/web/packages/cooccur/cooccur.pdf)

FD: Measuring functional diversity (FD) from multiple traits, and other tools for functional ecology (https://cran.r-project.org/web/packages/FD/FD.pdf) cluster: Finding Groups in Data (https://cran.r-project.org/web/packages/cluster/cluster.pdf) fpc: Flexible Procedures for Clustering (https://cran.r-project.org/web/packages/fpc/fpc.pdf) coin: Conditional Inference Procedures in a Permutation Test Framework (https://cran.r-project.org/web/packages/coin/coin.pdf) indicspecies: Relationship Between Species and Groups of Sites (https://cran.r-project.org/web/packages/indicspecies/indicspecies.pdf)

9. Evaluation

Type of activity	9.1 Evaluation criteria	9.2 Evaluation methods	9.3 Percentage in the final grade
9.4. Course	Knowledge of the information content	Writing exam	75%
9.5. Seminar/ laboratory	Ability to perform and interpret the specific structure of ecological communities	Project evaluation	25%
9.6 Minimum standard for passing			
Knowledge of at least 50% of the information that pertains to the given courses Acquiring the skills (in proportion of at least 60%) practised during seminars The minimum grade obtained in each of the two examinations (the writing test and the project evaluation) should be at least 5.			

10. SDG labels (Sustainable Development Goals)

	○ Sustainable Development Generic Label							
1 FĂRĂ SĂRĂCIE	2 FOAMETE „ZERO"	3 SĂNĂTATE ȘI BUNĂSTARE	4 EDUCAȚIE DE CALITATE	5 EGALITATE DE GEN	6 APĂ CURATĂ ȘI SANITAȚIE	7 ENERGIE CURATĂ ȘI LA PREȚURI ACCESIBILE	8 MUNCĂ DECENTĂ ȘI CREȘTERE ECONOMICĂ	9 INDUSTRIE, INOVAȚIE ȘI INFRASTRUCTURĂ
○	○	○	○	○	○	○	○	○
10 INEGALITĂȚI REDUSE	11 ORAȘE ȘI COMUNITĂȚI DURABILE	12 CONSUM ȘI PRODUCȚIE RESPONSABILE	13 ACȚIUNE CLIMATICĂ	14 VIAȚA ACVATICĂ	15 VIAȚA TERESTRĂ	16 PACE, JUSTIȚIE ȘI INSTITUȚII EFICIENTE	17 PARTENERIATE PENTRU REALIZAREA OBIECTIVELOR	No label applies
○	○	○	○	○	●	○	○	○

Date of entry:
10th of April, 2026

Signature of course coordinator

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Signature of seminar coordinator

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Date of approval in the department:
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Signature of the head of department

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